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No. II. OF VOL. I., 1924. **No. 5237. Vol. CCVI.** LONDON, SATURDAY, JANUARY 12, 1924. Founded 1823. Registered as a Newspaper. Published Weekly. **Pp. 112 - Price 1s.** Annual Subscription Inland £2 2s. Abroad £2 10s.

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An Address
ON
TYPES OF GLYCOSURIA AND THEIR TREATMENT.

Delivered before the Manchester Medical Society, on Dec. 5th, 1923,

BY W. LANGDON BROWN, M.D. CAMB., F.R.C.P. LOND.,
PHYSICIAN, ST. BARTHOLOMEW'S HOSPITAL.

ALTHOUGH carbohydrate forms more than 70 per cent. of our ordinary diet it seldom constitutes more than 1 per cent. of our body-weight. This simple consideration alone shows that it must be the most easily metabolised of the foodstuffs, and it would naturally lead us to expect that when the process of metabolism is disturbed it will show itself particularly in respect of carbohydrate. That true diabetes implies a great deal more than a mere disturbance of carbohydrate metabolism is easily shown by the fact that if the total amount of food be sufficiently reduced glycosuria will cease, but that addition of too much protein and fat to the diet will cause its return without giving any carbohydrate at all. Again, the culmination of diabetes in coma is not directly due to the sugar at all, but chiefly to disturbance of fat metabolism, though protein and even inorganic salts are also involved. Diabetes is a disease characterised by an exaggerated katabolism, which shows itself first, and most obviously, in respect of that foodstuff which is ordinarily most abundantly ingested and yet forms the smallest part of the bodily tissues.

THE LIMIT OF SUGAR ASSIMILATION.

There is a limit to the amount of sugar which anyone can assimilate, but this limit is high enough for all ordinary needs. A normal individual has to take ¼ per cent. of his body-weight, which means as much as 150 to 200 g. (5 to 7 oz.) of dextrose at one time before any will appear in the urine, but no amount of starch should cause glycosuria because the time taken in its digestion prevents the blood from being flooded with sugar. While the ingestion of sugar may therefore be followed by glycosuria without implying the existence of diabetes, Naunyn declared that anyone passing sugar after even a free ingestion of starch is a potential diabetic. Before accepting that statement without modification, we must consider the mechanism by which the body attempts to compensate for an impaired power to assimilate sugar.

(*a*) It may store more than usual in the more stable form of fat. As von Noorden showed, some cases of obesity merely amount to latent glycosuria. The escape of a valuable foodstuff is thus avoided, but like all pathological substitutes for a physiological method, it is an inferior one. It adds to the dead weight of the body, making activity more difficult, while its complete oxidation makes a greater demand on the already over-taxed energies. Clearly, there must be a limit to this deposit of fat and when this is reached some of the sugar overflows into the urine.

(*b*) The body may raise the threshold for sugar. Normally, the blood contains 0·1 per cent. of sugar. About 20 minutes after a meal containing sugar this begins to rise and may reach about 0·15 to 0·17 per cent., falling again after an hour or more. If this figure is exceeded some sugar will usually appear in the urine. But when sugar metabolism has been impaired for some time the blood-sugar will rise and yet no sugar need appear in the urine. Many treated diabetics may show no glycosuria with blood-sugar as high as 0·25 per cent., a figure at which the normal individual would inevitably excrete sugar.

Here again the pathological compensation is an imperfect one. Whereas, the normal 0·1 per cent. of sugar appears to be in colloid combination, amounts above this appear to be in simple solution—i.e., they act as crystalloids. In this form they raise the osmotic pressure of the blood and disturb the equilibrium of the tissue fluids. Several of the symptoms are due to this. Thus the polyuria and the consequent thirst are mainly due to depletion of the body tissues of water by this rise of osmotic pressure in the blood. More serious results of the same cause are alterations in the translucency of the crystalline lens, causing diabetic cataract, and the changes in the sheaths of the nerves causing neuritis. The liability to septic infections and carbuncle are probably due in the same way to this excess of blood-sugar, which, while reducing the resistance of the tissues, provides an excellent pabulum for bacteria.

Hyperglycæmia and Glycosuria.

But recent experiments by Allen show that hyperglycæmia has an even more fundamental effect, for if it be continued the cell islets of the pancreas swell up, become vacuolated, and ultimately burst their basement membrane. I think this throws light on the old-standing controversy as to whether all cases of diabetes are pancreatic in origin. I am of opinion that they need not originate in the pancreas; but it is clear, wherever they start, if they keep up a sufficient level of hyperglycæmia they will ultimately affect the structure of the pancreas. Presumably the cell islets become exhausted in the attempt to deal with the excess of sugar in the blood, for Allen also showed that by controlling hyperglycæmia the cell islets showed some power of recovery. Since the kidney can interpose a barrier or threshold of varying height to the excretion of sugar, examination of the urine is not a satisfactory measure of the sugar of the blood. Glycosuria may occur without hyperglycæmia, while hyperglycæmia need not be followed by glycosuria. The point of interest in cases of disturbed carbohydrate metabolism has therefore shifted from the urine to the blood, and we can modify Naunyn's phrase as follows: *Anyone with a resting hyperglycæmia is a potential diabetic.* If anything this definition is not inclusive enough, as we shall see. But it excludes cases of renal glycosuria, which belongs to an entirely different category from all other forms of glycosuria, and which do not depend on a disturbance of metabolism at all.

Renal Glycosuria.

The name of *renal glycosuria* has been given on the analogy of the effect of phloridzin poisoning, which seems to act directly on the kidney, causing it to secrete sugar, even when the sugar in the blood has been reduced below normal. I recently had an example of this in a young lady in whom glycosuria was detected in the course of routine examination. Further observations showed that she always passed about the same amount of sugar whatever the diet, the percentage usually lying between 1 and 2 per cent. Her blood-sugar was low and never reached the normal leak-point of 0·15 per cent. even after 50 g. of glycose were administered in one dose, nor did this increase the glycosuria. One may conclude that a glycosuria which keeps at 1 to 2 per cent. independently of diet is of this renal type, and a practical deduction is that such patients should not be put on a restricted diet. It is very difficult, if not impossible, to get them free from glycosuria, but it is easy to cause them to waste and to become ill if such an attempt is made. Doubtless some of the cases of persistent glycosuria without symptoms that are described from time to time are of this class. But I have also had instances of intermittent glycosuria of the renal type. Thus a young man of 21 had glycosuria detected on examination for life insurance and on one occasion afterwards. He had no other symptoms. His blood-sugar was 0·064 per cent., and after 50 g. of dextrose it never rose above 0·12 per cent., falling again to 0·065 per cent. in 1½ hours, without any glycosuria. He evidently had a low leak-point, but when 50 g. of dextrose were given this was not necessarily reached. Another young man, aged 20, showed traces of sugar in the urine on three occasions

on examination as to fitness for work in the East. His blood-sugar was 0·1 per cent. and did not rise above this figure at any time after 50 g. of dextrose. At the end of 1½ hours he passed 0·46 per cent. of sugar and his blood-sugar was as low as 0·05 per cent.

I do not see how it is possible to recognise renal glycosuria of this intermittent type without observing the blood-sugar curve after the ingestion of 25 to 50 g. of dextrose. The cause of lowering the kidney threshold is quite unknown, and although the condition is called renal glycosuria on the analogy of phloridzin poisoning the majority of such cases show no evidence of renal disease. In true nephritis there may be lowering of the threshold, but more frequently it is raised. I consider that such cases of renal glycosuria call for no treatment.

GLYCOSURIA DEPENDENT ON ENDOCRINE DISTURBANCE.

I will next deal with types of glycosuria which appear to depend on disturbances of endocrine glands. In order to comprehend these it is necessary to realise that the lowest or vegetative nervous system consists of two mutually antagonistic parts—the *sympathetic* which mobilises the body for defence, converting potential energy into kinetic, and the *parasympathetic* or extended vagus which stores up energy, especially the energy derived from the assimilation of food. Each of these coöperate with endocrine glands, the sympathetic with the adrenals, thyroid, and pituitary; the parasympathetic with the pancreas, and possibly the parathyroids. An important way in which the first group prepare for defence is by mobilising sugar into the blood-stream. Here it is normally utilised for muscular energy if the organism has to defend itself by fight or flight, or it is used for the production of fever. Cramer has shown that this is, at any rate, one of the ways in which fever is produced. If carbohydrate metabolism is normal the sugar is utilised at once, but if it is not there will be hyperglycæmia, though not necessarily glycosuria. Thus hyperglycæmia in pneumonia and rheumatic fever was observed some years ago before its significance was realised. I think we have in this fact the explanation of the influence of focal sepsis in aggravating diabetes. Sepsis will not necessarily cause hyperglycæmia. Thus, in six consecutive cases of recurrent boils I found hyperglycæmia in one but not in the other five. The occurrence of recognisable hyperglycæmia in sepsis indicates an imperfection in the sugar-storing mechanism, and if such an imperfection is already definitely present it will increase it. But it is defensive in origin and aim. In disease we frequently find a perversion of a defensive mechanism, and I look upon a parenchymatous enlargement of the thyroid as very frequently originating thus.

Thyroid Glycosuria and Hyperglycæmia.

I have recently had two striking examples of this disease in lads, where the enlargement was apparently due to a reaction against infection from septic tonsils; in each case the swelling went down considerably immediately after the enucleation of the tonsils, and although there was never glycosuria and no resting hyperglycæmia, the blood-sugar rose to 0·233 in one case, and to 0·21 per cent. in the other an hour after 50 g. of sugar were given, yet there was no glycosuria.

This is still more marked in exophthalmic goitre. I have never investigated the carbohydrate metabolism in this disease without finding a marked rise of blood-sugar following the administration of sugar. There may be no glycosuria because of the rise of threshold, but even the level of the raised threshold may be exceeded and then glycosuria follows. This may occur temporarily from a purely emotional cause. Thus in a severe and ultimately fatal case of Graves's disease in a man I had found marked hyperglycæmia. One day, some time after this, he suddenly passed sugar, and on inquiry I found he had had an emotional shock that day.

Do cases of hyperthyroidism ever develop true diabetes? I think they do if they have hyperglycæmia prolonged enough to damage their cell islets. A girl developed Graves's disease when her father became a prisoner of war in the hands of the Turks. Her condition grew worse as information as to his sufferings arrived, and when he died she was found to be suffering from glycosuria. After preliminary dieting the urine became free from sugar, but I found she had a resting hyperglycæmia of 0·198 per cent., which rose to 0·46 per cent. an hour after 50 g. of dextrose, when she passed 5·25 per cent. of sugar. She did well and kept free from sugar for about a year, when she suddenly went into coma as the result of an intercurrent infection.

An interesting case at present under my observation is that of a young woman with hyperthyroidism of 15 years' standing, which had produced not auricular fibrillation but auricular extra-systoles, which readily yielded to 2 gr. of quinidine sulphate twice a day. Her basal metabolism was + 55 per cent., and recently she had become troubled with fatty diarrhœa, the stools containing 53 per cent. of fat, 45·7 per cent. of which was neutral fat. Her diastase was 50 to 100 units, indicating a definite pancreatic insufficiency since the diastase output is usually lowered in ordinary hyperthyroidism. Her resting blood-sugar was 0·108 per cent., but it rose to 0·286 per cent. half an hour after giving 50 gr. of dextrose and even at the end of one and a half hours it was 0·23 per cent. when she passed 2·6 per cent. of sugar. At other times there was only an occasional trace of sugar. Yet her blood-sugar curve is that of severe diabetes. The following case is an interesting example of glycosuria in treated myxœdema:—

A lady of 55 was sent to see me with the following history. She was apparently one of the earliest cases to be treated by thyroid extract, about 30 years ago. She had taken 5 gr. daily ever since. In June of this year she complained of thirst and dryness of the throat, and her medical man found she was passing nearly 6 per cent. of sugar. On diet and 1 gr. of thyroid a day the sugar fell to a trace and then disappeared when the thyroid was reduced to ½ gr., but she began to get myxœdema again. Any increase of this dose or in the carbohydrate of the diet produced a return of sugar. When I saw her the only signs of myxœdema were a few patches of skin which suggested it, but she was passing sugar and her blood-sugar was very high—0·433 per cent. This seemed an ideal case in which to restore the balance between the thyroid and pancreas by insulin, but unfortunately she has a great prejudice against it. So I put her on Graham's "ladder diet" and allowed 1 gr. of thyroid a day; on this she kept free from sugar and the blood-sugar fell to 0·137 per cent. After a time we were able to increase the thyroid to 2½ gr. daily and maintain her blood and urine normal as to sugar although she was taking 1½ oz. of bread daily. It is worth noting that her father died of diabetes.

I think it is not unusual for patients with long-standing myxœdema to develop glycosuria. At St. Bartholomew's Hospital out of 11 consecutive cases four were found to be passing sugar (Garrod). It is well known that they may become intolerant of thyroid. But such marked hyperglycæmia is, I think, unusual. Even such cases can be successfully treated if alimentary rest is used as an aid to treatment and the dosage of thyroid is regulated with sufficient care. But the following case raises the question in a different and an interesting form:—

The wife of a medical man, aged 32, was worried because she was putting on weight rather rapidly. She therefore started taking 3 gr. of thyroid extract daily at Christmas, 1922, and lost over a stone in weight. In May, 1923, she suffered from palpitations and shortness of breath so she stopped taking thyroid, but her weight continued to fall in spite of rest. In September she became thirsty, had pruritus vulvæ, and was found to be passing sugar in large amounts. I found her resting blood-sugar was 0·38 per cent. I put her on 2½ gr. of quinine hydrobromide three times a day and dieted her by Graham's method. She became free from sugar on the first day of fasting, and when her diet contained 5 oz. of milk and 3½ oz. of bread her blood-sugar was 0·144 per cent. She is still free from sugar on 90 g. of added carbohydrate, but her blood-sugar is 0·153 per cent. and she is still losing weight, so she is starting a course of insulin. The pulse is still rapid and she is a little tremulous, but she has no other signs of hyperthyroidism.

What is the explanation of this case? Personally, I think her increasing weight was the first sign of impaired carbohydrate metabolism, and that taking

the thyroid extract converted her from a case of latent to one of consecutive glycosuria by still further upsetting her metabolism. One thing, however, to which I would specially call your attention is that as a case of Graves's disease improves the threshold may fall faster than the hyperglycæmia, so that I do not worry particularly about the appearance of a certain amount of sugar in the urine if the general condition of such a patient is obviously improving. Thus a woman of about 40 had Graves's disease and developed leukoderma. Her resting blood-sugar was 0·069 per cent., but after 50 g. of dextrose it rose to 0·323 per cent. at the end of an hour, yet she had no glycosuria. She improved very much, and as she did so she occasionally passed sugar. This was about four years ago and I frequently see her and she is apparently well.

The typical blood-sugar curve in hyperthyroidism is a sharp rise reaching its maximum in an hour and then usually a rather sharp fall again, but not reaching normal in one and a half hours (Mackenzie Wallis). In this type of case it is the thyroid rather than the glycosuria which calls for treatment, the essential features of which are rest, physical and emotional, removal of septic foci, particularly in the tonsils and bowels, and administration of quinine hydrobromide in doses of 3 to 5 gr. three times a day. The dietetic restrictions need not be very drastic as a rule.

Adrenal Glycosuria.

The antagonism between the pancreas and the adrenal medulla is well known. It is expressed in such phenomena as Loewi's adrenalin pupillary reaction, and in the dribbling secretion of pancreatic juice which follows removal of the adrenals, a secretion which can be checked by injections of adrenalin. But it is seen most clearly in the opposite effects of adrenalin and insulin on carbohydrate metabolism. That adrenalin injections could produce glycosuria was shown by Blum more than 20 years ago. Later it was shown that the diabetic puncture produced its effect through the adrenals and possibly the pituitary in addition. Severance of the nervous channels between the medulla and the adrenals rendered diabetic puncture inoperative. J. H. Burn has proved that there is no direct antagonism between adrenalin and insulin as there is between pituitrin and insulin. He agrees with the accepted view that adrenalin turns the glycogen of the liver into sugar, thus interfering with the storage mechanism.

As adrenalin raises arterial tension as well as producing glycosuria it is tempting to assume that the glycosuria associated with high tension in later life may be adrenal in origin, especially as it is apt to occur in overworked, worried people. But there is no proof of this. I should, however, like to call attention to the form of the blood-sugar curve in this nervous type of glycosuria. It is characterised by a sharp peak just where the normal curve is rounded. This peak exceeds the threshold, and this is when the glycosuria occurs. It suggests a delay in the storage mechanism coming into action. Now adrenalin is activated through the emotional nervous system and in its turn acts on the sugar-storing process. So that there is at least a prima facie case for investigation of such cases along the line of adrenal glycosuria. It is usually sufficient to deprive such patients of sugar as such while allowing them to take a reasonable quantity of starch. In this way the mechanism for storage of sugar as glycogen is not suddenly overtaxed immediately after food. The process of starch assimilation is a more gradual one. But the most important part of treatment is a holiday and attention to general hygiene.

Pituitary Glycosuria.

This is due to overaction of the pars intermedia of the pituitary. It is often associated with signs referable to other portions of the gland. If the pituitary is enlarged there may be optic atrophy and bitemporal hemianopsia, some interference with the third nerve and X ray evidence of enlargement of the pituitary fossa. If the anterior lobe is overacting there will be signs of acromegaly as well—if it is underactive there will be diminished sexual development, while if the posterior lobe is underacting there will be obesity and diabetes insipidus as well as mellitus. The glycosuria may be intermittent since the pituitary seems to be rhythmic in its functions, while the characteristic of the blood is the slow rise of sugar in it and an equally slow fall, giving a rounded form to the curve. Mackenzie Wallis has called attention to the frequency with which signs of pituitary disease occur in intermittent glycosuria, and has also pointed out the close resemblance between the blood-sugar curve in such pituitary cases and in the glycosuria as distinct from the lactosuria of pregnancy. This confirms the view that the glycosuria of pregnancy is due to the stimulating effect of pregnancy on the pituitary; the curious alteration of the facies in pregnancy resembling a mild degree of acromegaly suggests this also. We now have direct experimental evidence in support of this view. Dixon has shown that injections of ovarian extract stimulated the secretion of pituitrin, while J. H. Burn found that although pituitrin did not in itself cause hyperglycæmia, it was able to inhibit the fall of blood-sugar which would otherwise have followed the injection of insulin. I think, therefore, the statement is justified that the glycosuria of pregnancy is due to its stimulating effect on the pituitary which then directly inhibits the internal secretion of the pancreas. It may well be that in its inception this process is physiological, diverting the stream of sugar from storage in the maternal tissues to the use of the fœtus.

I saw an interesting example of this some years ago in a woman of 42, who looked acromegalic, had hair on her cheeks, a blood pressure of 170 mm., and glycosuria. She was pregnant, and as the pregnancy proceeded the glycosuria became less amenable and she developed hydramnios. Subsequently she was delivered of a living child, after which she remained free from sugar on an ordinary diet. The occurrence of hydramnios is interesting as it is a common complication of pregnancy in true diabetes. Yet pregnancy is not very likely to occur in a diabetic of 42. Some years afterwards she turned up again with diabetes of the ordinary type. I conclude that her pregnancy stimulated a pituitary already tending to be too active, and that afterwards, although she was free from glycosuria for some years, her blood-sugar kept at a sufficiently high level to exhaust her cell islets. Unfortunately, this case occurred before opportunities existed for routine examination of the blood-sugar. The influence of the male gonads on the pituitary I could also illustrate from a remarkable case, but for my present purpose it is sufficient to say that here a testicular graft for atrophy following mumps completely changed the blood-sugar curve.

The combination of glycosuria and Fröhlich's syndrome can only be explained by assuming an overactive pars intermedia with diminished activity of the rest. Thus a man of 50, who had always been fat, and then weighed more than 18 st., was found to have glycosuria. Sexually he was infantile and his blood-sugar curve was of the pituitary type, reaching 0·310 per cent. an hour and a half after the ingestion of 50 g. of dextrose, and still standing at 0·261 per cent. at the end of two hours when he passed 3·6 per cent. of sugar.

Pancreatic Glycosuria.

No difficulty is experienced in recognising cases of glycosuria associated with frank pancreatic disease. There is fatty diarrhœa, due, as in the case already referred to, to an excess of unsplit fats, and there may be creatorrhœa. The output of urinary diastase is increased to 50 units or more and the adrenalin eye test may be positive. Yet how often are such signs found in ordinary diabetes? It is true that they may be present in the early stages or even before glycosuria occurs and subsequently subside. Thus I saw a case of a young lady who had symptoms of

pancreatitis and then glycosuria. She cleared up with dieting for a time and then returned to ordinary food. After that she showed no evidence of pancreatitis but the ordinary symptoms of diabetes, which subsequently proved fatal. Unless one had seen this case in the early stages its pancreatic origin would have been missed.

TRUE DIABETES.

But when full allowance is made for all this, one must admit that the pancreatic origin of true diabetes is still unproven. My own view is that it is due to a more profound metabolic disturbance than that evoked by one endocrine gland. Eppinger, Falta, and Rudinger put forward the hypothesis of a disturbed endocrine balance as the cause. If one endocrine gland were diseased we could understand a loss of balance comparable to that which occurs when a group of muscles is paralysed. But such signs of endocrine disease are lacking in ordinary diabetes even if carefully looked for. It will be noted that the sympathetic stimulates all the endocrine glands which mobilise sugar into the blood—i.e., the thyroid, adrenal, and pituitary—while it probably inhibits the pancreas, either directly or by antagonising the vagus, thus checking sugar storage. Overaction of the sympathetic at any rate means increased katabolism and usually hyperglycæmia. And as hyperglycæmia if not caused by deficiency of the pancreatic cell islets, will at any rate damage them in time, we may admit that all cases of diabetes are ultimately associated with insufficiency of pancreatic internal secretion.

The blood-sugar curve starts above normal, rises very sharply, and keeps at a high level for at least two hours, so that it differs materially from the other curves I have discussed. But to my mind it is seldom necessary to do a blood-sugar curve in what appears clinically to be a clear case of true diabetes, nor is it advisable. This procedure should be reserved for glycosuria of doubtful origin.

Alimentary Rest.

The treatment of diabetes by alimentary rest undoubtedly represented a great advance. I still have cases under my care occurring in young people about 1915, when I started using this method systematically. They appear to be in an arrested state. But metabolically, they are at best among the lame and the halt, while many have fallen by the way. This is because we had no satisfactory method of checking hyperglycæmia with its evil consequences, for though interpolated days of fasting or of vegetable and egg diet have some effect in this direction, that effect is not sufficiently prolonged.

Insulin.

No words of mine are needed to commend insulin, for not only has its discovery proved a theoretical belief long held, but it has been of immense practical value already. I will merely describe my usual procedure with it and then consider some of the limitations of the drug. Throughout I will assume that the opportunities for blood-sugar estimations are present but restricted as they are in general practice. I first put the patient on a 48-hour mitigated fast, allowing soup, beef-tea, tea or coffee, water ad lib., and alcohol in suitable cases. Most cases become free from glycosuria on this. Then I give 48 hours of vegetable and egg diet. If the patient is still free from sugar I put him through Graham's Ladder Diet. At the top of the ladder, or if sugar reappears at any stage of it, I estimate the resting blood-sugar if this has not already been done, and if it is above 0·18 per cent. I give 10 units of insulin daily before breakfast or lunch. If the resting blood-sugar is between 0·14 and 0·18 per cent. I give only 5 units. If it is below 0·14 per cent. I do not regard the case as one for insulin. I like to know the blood-sugar six hours after insulin is given, for the dosage will largely depend on the rate at which it falls. Even if the patient is keeping free from glycosuria on insulin I do not add carbohydrate to the diet for two or three weeks. If not free from sugar on 10 units daily I give a second dose of 5 units, and may increase the dosage to one of 15 and a second of 10 units. I do not often find it necessary to exceed these doses except in actual or threatened coma. I believe that difficulties which appear to call for higher dosage are often due to adding carbohydrate to the diet too soon, when the action of insulin may become uncertain. When conditions appear to have become stable I add 5 oz. of milk to the diet, and two days later add ½ oz. of bread, increasing this by ½ ounces every other day until 4 oz. are reached, provided there is no return of glycosuria and the blood-sugar is keeping within normal limits. I do not trouble about slight returns of glycosuria if the blood-sugar is continuing to fall, as I think the kidney threshold often falls quicker than the hyperglycæmia as the case improves.

If the patient continues to be free from sugar the question will arise whether to diminish the dose of insulin or to increase the diet. If the calorie intake is adequate and weight is being maintained, I diminish the dose of insulin unit by unit until sugar just reappears; then interpolate a day of vegetable and egg diet and after that return to the former diet with 1 unit more of insulin than that on which glycosuria recurred. If the calorie value is low I increase the carbohydrate in the diet while keeping the dose of insulin the same. When sugar just reappears I interpolate a day of vegetable and egg diet, and then return to the former diet with only three-quarters of the amount of carbohydrate taken during the day on which glycosuria recurred. In any case I give a day of vegetable and egg diet once a fortnight. But details must depend on the individual case.

Acute Cases.

As an example of its success, I may quote the case of a little girl with severe diabetes with ketosis of recent origin, and a blood-sugar of 0·42 per cent. She is now keeping free from glycosuria and hyperglycæmia on a diet of approximately 1600 calories including 5 oz. of milk and 1½ oz. of bread without any insulin, and she has never had more than 5 units a day, which was gradually diminished as the blood-sugar fell. For more than a month now she has had no insulin at all, yet the blood-sugar is only 0·065 per cent. Indeed, I have been struck with the extraordinarily good results one may get with insulin in children. It is too early to speak positively, but it appears to me possible if the hyperglycæmia is thus controlled, that as the child grows fresh cell islets come into existence without being damaged as fast as they are formed. In this way the type of case which was previously the most unsatisfactory may become the most hopeful to treat. The following case still under my care suggests, however, that sometimes diet alone may be as successful as when aided by insulin:—

A girl of 26, whose symptoms were of very gradual onset but probably of a few months' duration, had a blood-sugar of 0·26 per cent.; ketosis was present. After alimentary rest she reached the top of the ladder with a blood-sugar of 0·1 per cent. On gradually increasing the carbohydrate intake to 5 oz. of milk and 2½ oz. of bread, which equals 46 g. of added carbohydrate, glycosuria just reappeared with a blood-sugar of 0·14 per cent. She then had a day of vegetable and egg diet which cleared up the glycosuria, and the same plan was repeated with 5 units of insulin daily. Glycosuria reappeared in spite of this when the added carbohydrate was only 38 g. She then kept free from glycosuria with a normal blood-sugar and without any insulin on less carbohydrate.

The interesting features here are the prompt improvement on diet and the failure of insulin to improve the situation as to carbohydrate tolerance. But as the blood-sugar began to rise again and reached 0·19 per cent. I have resumed insulin.

Chronic Cases.

The effect of insulin is not nearly so striking in the chronic cases. I have tried it on several of my original cases which have been treated by alimentary rest since 1915 or 1916, and although some degree of benefit has undoubtedly resulted, I have, on the whole, been rather disappointed. The following case

is worth considering because, owing to the skilled and devoted attention the patient receives, the data are specially full, though I do not propose to burden you with the details. He is now about 60 and retired from his profession about 15 years ago on account of diabetes. Just ten years ago I saw him on the verge of coma. On the somewhat unsystematic methods of alimentary rest we were then experimenting with he improved very much, and until the introduction of insulin he remained in a stationary condition on a very restricted diet, although on one occasion an attack of influenza nearly sent him into coma again. He was one of the earliest cases to be treated with insulin in this country, but his improvement has not been very striking. The difficulty is that if his blood-sugar is brought down even to 0·15 per cent. he has hypoglycæmic symptoms, while at this level of blood-sugar he can tolerate only a very limited diet without a return of glycosuria. It seems to me that only those cases of severe diabetes survive for anything like this length of time which can adjust themselves to bear a certain degree of hyperglycæmia, and if this is now reduced they become uncomfortable at once. But if the hyperglycæmia continues it follows of necessity that no striking improvement can occur.

Another difficulty may occur with insulin treatment if the weight is allowed to increase quickly. Metabolism bears a definite relation to the total body-weight, and, as this goes up, the whole of the metabolic processes are increased. So that the chances of recurrent glycosuria are thereby enhanced. We should not be too eager to increase the weight rapidly.

FAT METABOLISM IN DIABETES.

The following case illustrates some points in connexion with the difficult question of lipæmia in diabetes. A man of 40, who had been known to be suffering from glycosuria for about two years, was admitted to St. Bartholomew's Hospital under my care with 2 per cent. of sugar and definite ketosis. He did not become free from sugar on a fast or on going up the ladder. He showed marked lipæmia and a blood-sugar of 0·263 per cent. Ten units of insulin were given daily, which rendered him free from sugar, but as he began to get œdematous his diet was increased and a second dose of insulin, 5 units, was given daily. On this his blood-sugar was 0·117 per cent., but the lipæmia increased; and he began to sweat after insulin was given, the first indication, in my experience, of hypoglycæmia. His insulin was therefore reduced to two doses of 5 units, the vegetables containing 5 per cent. of carbohydrate were increased, and the fat in the diet was reduced as much as possible. His blood-sugar rose to 0·17 per cent. and lipæmia was still present. I now decided to increase both the insulin and his carbohydrates to see whether in this way we could get him free from lipæmia. On reaching a calorie value of 1818, including 45 g. of carbohydrate as well as fat, we abolished lipæmia and kept the blood-sugar at 0·137 per cent. with two daily doses of 10 units of insulin. On this he was free from glycosuria and acetonuria. The conclusion would appear to be that lipæmia is best treated by increasing both the carbohydrate diet and the dosage of insulin. His general condition decidedly improved on this line of treatment. T. H. Oliver says:

> "Fat properly absorbed into the tissues appears to increase the storage of carbohydrates; if not so absorbed, or if mobilised by calcium, the storage is interfered with. Possibly improper storage of the fat may account for the tendency of a high fat diet to produce glycosuria in some cases of diabetes. It is noticeable that practically all conditions which lead to a hyperglycæmia lead to a lipæmia as well; this may be attributed to diminished oxidation."

At any rate, we may agree that this shows how close are the links between the metabolism of the two foodstuffs, and that diabetes is not merely a disturbance of carbohydrate metabolism. My case would further show that it is sometimes easier to control lipæmia if the amount of carbohydrate metabolised is deliberately increased by adding starch to the diet and giving larger doses of insulin than by restricting the fat in the diet.

It has, of course, long been recognised that it is the disturbance of fat metabolism which ultimately leads to coma. It was the recognition by Hurtley that much of the toxic diacetic acid came not from the fat of the tissues but from the fat of the food, which led in this country to the introduction of alimentary rest by Graham. In America Allen reached the same conclusion as to treatment by a different route. Since this has been appreciated coma has become rarer, though sometimes it remained inevitable in cases of "total" diabetes, or in the presence of intercurrent infection, particularly as we were still without a method of controlling the hyperglycæmia effectively, which in itself further disturbs fat metabolism.

DIABETIC COMA.

Now that we have in insulin a method both of controlling hyperglycæmia and improving fat metabolism, our hands have been greatly strengthened in dealing with diabetic coma. A striking success was achieved in such a case under my care with Dr. Graham's aid. A man was admitted to St. Bartholomew's Hospital in deep coma. His blood-sugar was 0·39 per cent., there was marked lipæmia, and his alveolar CO_2 only 0·9 per cent. His bowels were cleared out with an enema of magnesium sulphate and 30 units of insulin were given at once. In the course of 24 hours 110 units were given and the blood-sugar fell to 0·23 per cent. Two days later air-hunger returned and his blood-sugar rose despite 140 units of insulin to 0·36 per cent. He complained of pain in the right ear and the drum was found to be bulging. It was punctured and pus escaped. After that he steadily improved, and we succeeded in keeping his blood-sugar normal on two doses of insulin daily, one of 20 and the other of 10 units. He remained free from sugar for a month before discharge from hospital, although his calorie intake was worked up to 2365. I recently heard that he is still free from sugar and diacetic acid, although it is six months ago since he was admitted. This case illustrates very well the powerful aid insulin renders in coma, but also the great influence focal sepsis has in antagonising it, for the blood-sugar rose to 0·36 per cent. in the presence of otitis media in spite of 140 units of insulin.

I cannot hope to have dealt with all the aspects of a problem which is now changing from day to day, but it is only by pooling our common experience that advance can be made. And once again I would like to urge that it is resting hyperglycæmia that matters, for it establishes a vicious circle of serious import.

An Address
ON
INSULIN IN GENERAL PRACTICE.

Abstract of a Paper read before the Hampstead Medical Society on Dec. 6th, 1923,

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INSULIN can be used in general practice with great advantage to the patient and without any danger, provided that certain precautions are observed. There has naturally been some difference of opinion as to the best method of using insulin. Banting[1] and the Toronto school, and Allen[2] in U.S.A., Graham and Harris,[3] Spriggs,[4] Poulton,[5] MacLean[6] in this country all argue that the aim of the physician should be not only to render the urine sugar-free but also to maintain the amount of sugar in the blood within the normal limits of 0·09–0·12. Joslin[7] aims at keeping the urine sugar-free, but Geyelin,[8] Woodyat,[9] Wilder,[10] all think that it does not matter if the patient does pass sugar and has a high blood-sugar just before the insulin injection.

IDEAL OF TREATMENT.

My experience during the last six months, after watching the progress of the patients who are having insulin, has confirmed me in my opinion that it is essential to maintain the same ideal as we have always had—namely, to keep the blood-sugar within normal limits if the patient is to continue to progress satisfactorily. The first patient treated in the medical clinic at St. Bartholomew's Hospital illustrates very well many points and difficulties in the use of insulin. The patient, a man, aged 26, had been ill for three years, and had been very near coma about four weeks before admission. In spite of two starvation days, two egg and vegetable days, and two more starvation days, he continued to pass sugar, and the blood-sugar remained at 0·20 per cent. When the diet was increased to protein 53·2 g., fat 109·5 g., and 16 g. of

FIG. 1.

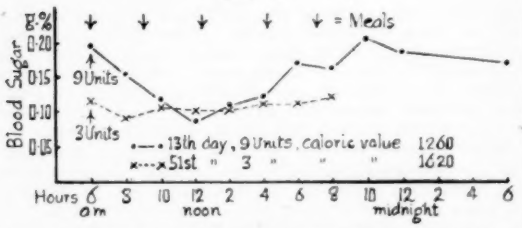


Chart to illustrate fall of blood-sugar after 9 units of insulin on the 13th day of treatment and after 3 units on the 51st. (From "Pathology and Treatment of Diabetes Mellitus," Oxford Medical Publications.)

sugar in the form of vegetables, total calorie value 1260, the blood-sugar varied between 0·23–0·25 per cent. and the sugar output from 25–33 g. Insulin was given in gradually increasing doses up to 10 units, and by the thirteenth day the urine only contained sugar in the period immediately before the insulin injection, and the blood-sugar at that time was 0·20 per cent. The blood-sugar was estimated throughout the day at two-hourly intervals, and the curve (see Fig. 1) is typical of the action of insulin, and should be remembered whenever the action of insulin is considered. The maximum lowering of the blood-sugar in this case occurred at the sixth hour after the injection (although at may be as early as the third hour) began to pass off at the tenth hour, and was completely over at the sixteenth hour. The diet and dose of insulin were kept constant, and the morning blood-sugar gradually diminished to within normal limits, so that by the fifty-first day, after only 3 units of insulin, it was below 0·11 per cent. for 14 hours. The patient's sugar-tolerance continued to improve, and on the seventy-third day, when no insulin was given, he was able to eat 40 g. of bread without passing any sugar in the urine, though the shape of the blood-sugar curve was abnormal. Now, ten months after the treatment was started, he has gained 1½ stone in weight, and feels very well. He has usually had a normal blood-sugar 24 hours after the last insulin injection, but when he had a cold and sore-throat the blood-sugar was 0·19 per cent. The diet was therefore reduced from 1800 to 1400 calories, the bread was stopped, and the insulin increased to 20 units. Two weeks later the blood-sugar was again normal, and the insulin was reduced to 15 units, and the diet slowly increased again.

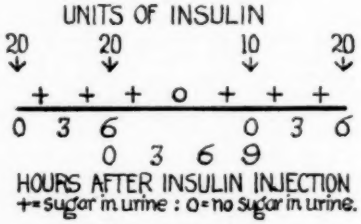
Blood-sugar Observations Not Essential.

In learning how to use insulin it was necessary to make many observations of the blood-sugar, but these are now unnecessary, provided that the urinary sugar is watched and the effect of the insulin observed. But before starting treatment it is important to discover and treat any other sources of infection, such as boils, pyorrhœa, or any septic foci. Tuberculosis of the lungs should be sought for most carefully, as it is a common complication in long-standing cases. It is a good plan to start the treatment with an attempt to get the urine sugar-free by dietetic measures. It is wiser to keep the patient in bed, but it is not necessary to give a long period of starvation, such as Allen originally used, but a one or two days' fast, followed by a gradual increase in the diet to three eggs, 2 oz. of meat, 2 oz. of bacon, 2 oz. of ham, 1½ oz. of butter, 1 oz. of cream, 12 oz. of cooked green vegetables, and 4 oz. of uncooked vegetables. This makes a total of 57·7 g. protein, 118 g. fat, 16 g. of sugar in the form of vegetable, with a calorie value of 1358. This amount of food is sufficient for an adult of 10 st. 5 lb., and is rather less than 1 g. of protein per kilo (½ g. per pound) and 21 calories per kilo (10·5 per pound). If the patient weighs more or less than 10 st. 5 lb. the diet must be increased or decreased, keeping the proportion of grammes of protein and calories per pound about the same.

Value of a Standard Diet.

It is, I think, a great advantage to have a standard diet, such as the ladder diet, as it is very simple for the patients to carry out, and the necessary deductions or additions, according to the weight of the patient, are very easily made. The correct diet for children is much more difficult to adjust. The basal heat production should be ascertained from the tables of Benedict and Talbot, or from Wilder's nomograph.[11] An addition of 20 per cent. is made to allow for the effect of exercise, &c., and the diet worked out, allowing 1·0–1·5 g. of protein per kilo (0·5–0·75 g. per pound of body-weight). If on this diet the patient continues to pass sugar, 10 units of insulin should be injected before breakfast, and the urine collected in approximately three-hour periods throughout the day. The urine should be tested qualitatively for sugar by Fehling or Benedict's test. A nurse or the patient can soon learn to do these tests, and keep a three-hourly chart of them for the doctor. If the patient was passing sugar the blood-sugar was over 0·19 per cent., and the urine passed in the first three hours will certainly contain sugar. If,

FIG. 2.



Three-hourly chart.

however, the blood-sugar has decreased, as in Fig. 1, below 0·19 per cent., there will be no sugar in the urine from three to six hours after the insulin. If, however, the dose of insulin was not big enough, the blood-sugar will not fall below 0·19 per cent., and sugar will be present in every specimen. In this case, after three days, the dose of insulin should be increased to 15 units, and if the specimen of urine still contains sugar, the dose must be increased to 20 units after another three days. If the dose of insulin is sufficient to lower the blood-sugar below 0·19 per cent., the urine from three to six hours will be sugar-free; but that from six to nine hours will contain sugar, if the blood-sugar has risen above 0·19 per cent. If this occurs the dose of insulin should be kept steady, and the urine of the period from six to nine hours tested daily. If the dose of insulin is adequate the sugar-tolerance of the patient will improve, and the urine of the period six to nine hours will become sugar-free. If it does not, then the dose of insulin must be increased. If the urine for six to nine hours becomes sugar-free, the urine from nine to 12 hours must be tested, and this in turn will become sugar-free. This process must be continued until the urine is sugar-free throughout the 24 hours.

Watching for Overdosage.

At this stage it is a great advantage to know what the blood-sugar is, but if this is not possible it can be gauged by watching the effect of the insulin. An adult who has a normal blood-sugar cannot take more than 10–12 units on this diet without having mild symptoms of overdosage. It is not necessary to give sugar for the mild symptoms like sweating or inertia as a hot drink, an egg or a tomato will at once relieve the patient. If the method described here is used there should be no serious symptoms, but it is well to warn the patient or nurse that adrenalin, 1 in 1000, ℥ xv., subcutaneously will at once relieve the symptoms, or two to four lumps of sugar by mouth.

If no symptoms of overdosage occur after 20 units it is probable that the blood-sugar is above 0·14 per cent., and the insulin should be kept steady at 20 units until symptoms are produced, and should then be decreased by 2 units at a time, watching the patient carefully. Experience has shown that the symptoms do not always tally with the blood-sugar, and it is a great advantage to know exactly how high the blood-sugar is before the insulin is given. When the blood-sugar is normal, and only 10 or 15 units are required, the diet can be gradually increased, but it is wiser to add to the protein and fat ration in preference to the carbohydrate, so as to give the β cells of the islands of Langerhans as good a rest as possible. The calorie value may be raised to 1800 or 2000, and the protein ration to 1·5 g. per kilo (0·75 g. per pound) of body-weight.

Procedure in Mild Cases.

The above procedure is necessary for the patient with severe diabetes, who continues to pass sugar even after severe dietetic restrictions. Most patients cease to pass sugar on the diet suggested, but the blood-sugar may still be high, 0·17 per cent., and it is an advantage to know the blood-sugar at this stage. If this is not possible, a dose of 10 units should be given each day, and the effect of increasing the dose to 12 or 14 units watched. If, after 14 units, no symptoms of overdosage such as sweating or a feeling of inertia are observed, the blood-sugar is probably above 0·14 per cent. The dose should be kept at 14 units until symptoms appear, and then decreased to 12 or 10 units. When this stage has been reached the diet should be kept constant for two to four weeks before the addition of the extra protein and fat. Later on ½ oz. of bread may be given after the insulin injection. If this is tolerated the bread can be increased by ½ oz. portions, first at the insulin meal and later on at other meals. The exact correspondence between sugar and insulin is not quite certain, but 1 unit is sufficient for 1–1·5 g. of sugar. This ratio is important if it is desired to add bread together with the equivalent amount of insulin. Although it is sometimes necessary to do this, I do not think that it is really good practice. The insulin requirements of the full ladder diet with 16 g. sugar are not yet known, but may be regarded as 50 units $+x$ units. If a patient is being given 10 or 20 units, it is clear that the β cells of the patient will only have to produce 30 or 40 units $+x$ units. It is this relief of the β cells by the correct use of insulin which is the important point to bear in mind. Even if the patient can also eat 1 oz. of bread the insulin requirements will be 50 units $+$ (14 or 8) units $+x$ units. The correct way is still to think that the β cells are being spared the production of 10 or 20 units of insulin.

If the patient continues to pass sugar after 20 units in the morning, he needs more insulin, but it is wiser to treat such a patient either in a hospital or nursing home, or with two competent nurses, in order to avoid the danger of overdosage, since the dose may have to be increased to 25 units in the morning and 20 units at night.

Treatment of Coma.

The condition of coma requires prompt treatment with large doses of insulin. There is usually already an excess of sugar in the blood, as it has varied from 0·30–0·39–0·73 per cent. in my last three cases, so that it is usually safe to give 30 units of insulin. But a dose of 50 g. (2 oz.) of dextrose by mouth or by œsophageal tube cannot do any harm. If the patient has not shown any signs of returning consciousness in three hours another 20 units should be given. The dosage can be gauged by testing the urine every three hours. If sugar is still present from three to six hours after the injection it is safe to give another 20 units. If there is no sugar in this specimen no insulin should be given until sugar reappears, and then only 10 units. In this way the dose of insulin can be regulated with safety. It is better to give water only for two days, and then start on the gradual ascent of the ladder diet. It is most important to search for any other sign of infection, as in four out of five cases of coma at St. Bartholomew's Hospital an acute infection has been found. If this is the case, the calorie value should be rapidly increased, and the insulin dosage regulated accordingly.

OPERATIONS AND MINOR AILMENTS.

Patients suffering from such conditions as carbuncles, gangrene of the leg, appendicitis, &c., should be prepared for operation by treatment with insulin. If the operation can be delayed for a few days it is better to get the urine sugar free by fasting and insulin, but if the operation is urgent a dose of 30 units of insulin and 50 g. (2 oz.) of dextrose should be given immediately before the operation. Afterwards the diet for some days should consist of the ordinary diet which is given to this type of case, milk, &c. The sugar output is watched by testing each specimen of urine and giving insulin on the same system as that described in the treatment of coma. The anæsthetic should be gas and oxygen by preference, but if this is not sufficient a little ether may be given as well. Local or spinal anæsthetics are very good.

The minor ailments, such as "colds in the head," tonsillitis, &c., require careful treatment. They should always be taken seriously, and the patient should go to bed. It is better to reduce the diet by one-third and add another 5 units to the dose of insulin. When the patient is better the food can be increased again. Whether the infection acts directly on the β cells, or indirectly by causing a demand for a bigger output of insulin than they can produce, is unknown. The minor infections are largely responsible for the decline in sugar tolerance which was so disappointing in the old days. One important point in the treatment is to relieve the constipation which is nearly always present, and especially when the patient is comatose.

From this description it is clear that the use of insulin does not free the patient from dietary restrictions, but the improvement of the clinical condition is so striking that the patients are much more willing to put up with these than they were before insulin was introduced.

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Sir James Crocket, Dallington Lodge, Northampton, Vice-chairman of the Northampton General Hospital, has sent a cheque for £5000 towards the cost of a new isolation block.

A CASE OF HEART-BLOCK PRESENTING SOME UNUSUAL SIGNS.

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THE case here described exhibited certain features of clinical and cardiographic interest which seem to merit recording.

A male, aged 20, had pneumonia at 10 years, and doubtful tuberculous peritonitis at 13. Influenza in 1919. Admitted to the City of London Hospital in April, 1920. He was then very anæmic, had a soft systolic mitral bruit, stained sputum, and mild, irregular pyrexia. There were no abnormal signs in the lungs, and the sputum was negative for tubercle bacilli on 11 occasions. Discharged improved, and having gained 7 lb. in weight. Readmitted January, 1921, with hæmoptysis. He was afebrile, with pulse of 110. Sputum was negative as to tubercle bacilli on nine occasions. Hæmoptysis ceased, pulse was reduced to 80, and on discharge he went back to his work. Later developed "faint attacks," though he never completely lost consciousness, and he was admitted to the hospital again in October, 1921. He then complained of fainting attacks, dyspnœa, and palpitation. The heart was normal in size; there was a systolic murmur at apex conducted to axilla. At the base the sounds were normal. The pulse was 84, of fair volume and tension. The lungs were normal, the urine contained a faint trace of albumin. No other abnormalities discovered.

Cardiographic Findings and Course of Case.—Prior to this admission a cardiogram (Fig. 1) had been taken. This showed a slight grade of block, the As-Vs interval being 0·24 seconds. The ventricle responded to supraventricular stimuli, but the form of complex was abnormal, occupying 0·14 seconds. There was slight notching of the downward deflection, and the picture was that of a contraction commencing in the left ventricle. Conclusion: Partial block of the main division of the bundle and also block of the right branch of the bundle. Both Wassermann reaction and blood culture were negative. Blood count showed only a slight degree of anæmia. About a fortnight after admission the pulse-rate suddenly dropped to 36 per minute, and it was evident that complete block was established. The second cardiogram (Fig. 2) showed complete heart-block; the auricle was contracting at the rate of 120 per minute, the ventricle 36 per minute, but whereas in the previous cardiogram the right branch of the bundle was shown to be blocked, in this case it was the left branch which was in default, as evidenced by the direction of the deflections. On Nov. 13th, 1921, the complete block had disappeared, and the appearances of the cardiogram were the same as in Fig. 1. The following day complete block occurred again and remained complete till death. On the 17th, at 8 P.M., the patient felt dizzy and "lost himself" for a second. During the whole of the 18th he felt very "seedy," and the following night he had a bad attack of faintness with slight twitching of the face and limbs, but no convulsion. Lesser attacks occurred frequently. At the apex of the heart the auricular beats could be distinctly felt and seen, and with the stethoscope could be heard as loud regular beats bearing no time relation to the forcible ventricular beat which occurred usually at the rate of about 24 per minute. Occasionally the ventricular beat would stop for a period of 10–12 seconds, the patient's eyes would close, and the succeeding beat would be followed by a deep sigh and reopening of the eyes; there was no twitching. Atropine and sodium salicylate in full doses produced no effect on the heart-rate. Mercury and iodides also failed to produce any effect. Cardiograms showed, on Dec. 24th, complete heart-block with right bundle branch block; on the 28th complete heart-block with left bundle branch block; and on Jan. 8th, 1922, the complete heart-block with right bundle branch block again. On Feb. 2nd the patient's condition continued so distressing that it was determined to try the effect of digitalis in an endeavour to stimulate iodiopathic contractions in the ventricle. He was given 1/240 gr. nativelle twice daily, and on the 11th the auricular rate had fallen to 80–90 from 110–120, whilst the ventricular rate remained unchanged. On the whole the patient felt rather more comfortable and had no attacks. Another cardiogram (Fig. 3) showed that the period between the auricular beats was unequal; some beats were inverted and appeared to arise from an ectopic focus. On the 14th definite coupling appeared and the digitalis was stopped. The patient was quite comfortable and the ectopic beats were effective. Another cardiogram (Fig. 4) showed an auricular rate of 140–150. The auricular complexes were abnormal; in lead 3 they were alternately inverted, the rise in rate to about double suggested the possibility of alternate auricular extra systoles. There was coupling of the ventricular beats; the first beat of the couple, supraventricular, showed right side branch block following an ectopic beat arising in the left side of the ventricle. In lead 1 the second beat of the couple was apparently arising in the interventricular septum. Subsequently the patient had no further faint attacks, he felt more comfortable, but complained of palpitation. The auricular systole was not nearly so forcible, and the sound could be heard faintly over the base of the heart, but not at all at the apex.

FIG. 1.

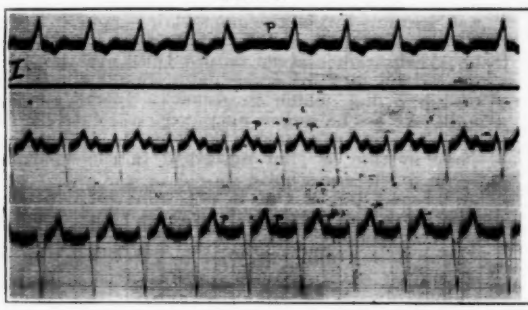

FIG. 2.

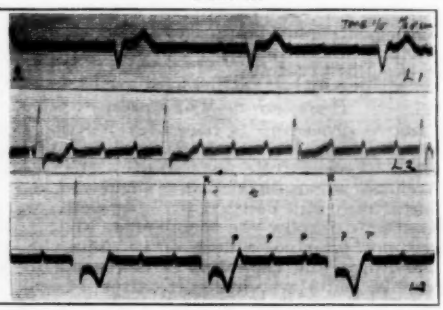

FIG. 1.—Partial block of main division of bundle and block of right branch of bundle.
FIG. 2.—Complete heart-block of left branch of bundle.

On March 7th it was resolved to make a further effort to propagate ectopic beats via the sympathetic system. Half a grain of thyroid extract was given three times daily and gradually increased to two grains. It was stopped on the 18th, the patient complaining of specks in front of his eyes and palpitation. During this time he had short attacks, lasting a few minutes, in which the pulse-rate rose to 60–70, but they distressed him, and we were never able to cardiograph him in one of these periods. As no drugs appeared to have any beneficial effect he was from this date given little in the way of treatment. His condition varied little, there were short periods of slight improvement, but on the whole he went progressively downhill. On August 26th he began to have more faint attacks with slight twitching. Adrenalin was tried, but failed to give any relief, and he died on the 29th in an attack. During the whole illness he never had a convulsive attack.

Post-mortem Examination.—This examination, made on the 30th, showed soft recent adhesions of both pleural sacs with old, tough adhesions at the left base, and much engorgement of both lungs with bronchioles filled with mucus. The liver showed a typical "nutmeg" appearance, and the spleen was hard and fibrotic, with a thickened capsule but no infarcts. The pericardium contained some 5 oz. of clear fluid and the heart weighed 21 oz. The heart muscle was hypertrophied and rather pale in colour. Both auricles were dilated, especially the left, in which the endocardium was thickened. There was also slight thickening of the flaps of the mitral valve, but no lesions were noted in the other valves. There were many yellowish-white patches

of degeneration visible in the myocardium immediately beneath the endocardial lining. These patches were most marked in the interventricular septum (Fig. 5) and presumably involved the bundle of His. Unfortunately it was not possible to cut serial sections of the bundle, but isolated sections of one of these yellowish-white patches in the septum showed typical chronic myocarditis with well-marked patches of new-formed connective tissue with fibroblasts.

FIG. 3.

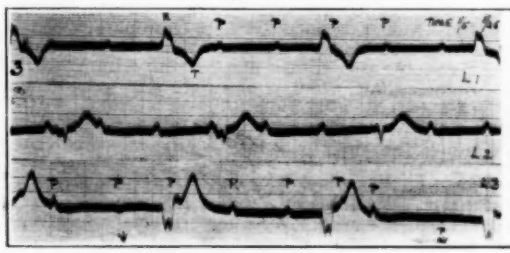

FIG. 4.

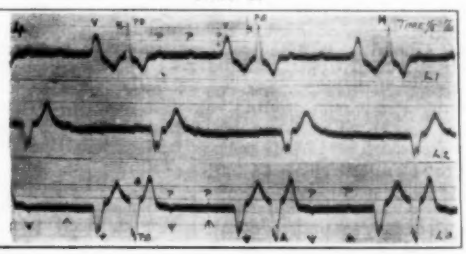

FIG. 3.—Showing unequal periods between auricular beats; some of the latter were inverted, and apparently arose from an ectopic focus.

FIG. 4.—Alternately inverted auricular complexes in lead 3, the rise in rate suggesting possibility of alternate auricular extra-systoles. There was coupling of ventricular beats; the first (supraventricular) beat of the couple showed right-side branch block, following an ectopic beat arising in left side of ventricle. In lead 1 the second beat of the couple apparently arose in the interventricular septum.

Interesting Points in the Case.

The points of special interest in this case are as follows:—

1. The mode of onset, short history, and complete invalidity of the patient. During the whole illness he had to be kept flat, and much of the time had the foot of his bed raised.

2. The very forcible character of the auricular beat at the commencement. In most cases the auricular beat can be heard at the base, but it must be very rare to hear it so plainly at the apex, and still more so to be able to see and feel it in that situation.

3. From the fact that the patient had a bundle branch lesion at the time when there was only delay in the main branch of the bundle we may reasonably assume that the picture is that of a branch block and not that of an ectopic beat arising on one or other side of the ventricle. If the first cardiogram (Fig. 1) had not been seen it would be hard to prove that this latter was not the true reading. It would seem that we must assume two lesions of the bundle system, the upper rapidly involved the main bundle, the lower probably situated near the fork of the branch, so that the extension or recession of the inflammatory area at one time involved one side of the bundle and at another time the other. A simultaneous involvement of both branches may have been the cause of death.

4. The slowing of the auricular rate under the influence of digitalis and the alteration of the auricular complexes as evidenced by inverted P waves in Fig. 3. (Direction of P waves marked in cardiogram by a broad arrow.)

5. The increase of auricular rate 90–130 under the further influence of digitalis. Possibly if the digitalis had been continued the auricle would have proceeded to fibrillation.

6. The notching and diphasic appearance of the P wave whilst under digitalis, which is not to be noted at any other time.

7. The picture of the ventricular ectopic beats stimulated by digitalis. In nearly all cases the idiopathic ventricular beat arises on the same side of the heart as the contraction starts—i.e., the side away from the blocked branch. The normal appearance of the idiopathic beats in lead 1 in association with this double block supports Hewlett's proposition (*Heart*, 1921, vol. ix., 1) that such complexes are an indication of an idiopathic ventricular beat arising in the ventricular septum.

FIG. 5.

Heart of the case described, showing light patches of degeneration in myocardium immediately beneath endocardial lining, being most marked in the interventricular septum, and presumably involving the bundle of His.

Since this article was written an interesting paper on the Action of the Auricle during Periods of Ventricular Silence has been published by Wiltshire.[1] His graphs show gradual failure of the auricle, ectopic auricular beats, and periods of auricular flutter. Other cases have been published showing auricular fibrillation as a sequel to complete block. In the case recorded the auricular beat remained regular and constant except as a result of the administration of digitalis, when slowing of the rhythm and ectopic beats gradually appeared. It would appear that the piling up of stimuli unable to pass the bundle is one factor which may produce alterations in the auricular rhythm, flutter, or fibrillation.

We have to thank our colleagues Dr. W. J. Hadley for access to the case and permission to publish these notes, and Dr. F. G. Chandler for use of the out-patient notes.

[1] Heart, 1923, x., 2.

THE CRITERIA OF CURE IN TUBERCULOSIS OF THE GUINEA-PIG.

WITH SPECIAL REFERENCE TO DIAPLYTE ANTIGENS.*

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THERE is evidence to show that the majority of individuals possess a good deal of natural immunity against the tubercle bacillus, or are able to elaborate, should necessity arise, sufficient protective substances to overcome moderate degrees of infection. But, on the other hand, when once tuberculosis becomes established the mortality-rate is very high. The treatment of the disease is still one of the most pressing problems in practical medicine, for while no therapeutic agent having a specific action on the bacillus has yet been discovered, immunological methods of treatment have met with only partial success, though since the days of Koch's original tuberculin many forms of tubercle antigen have been suggested.

The literature of tuberculosis is full of the records of experiments dealing with the treatment of tuberculous animals, chiefly guinea-pigs. For the most part the materials employed have not proved satisfactory, but some authors report astonishingly good results. Takeoka,[1] treating tuberculariscd rabbits and guinea-pigs with taurin, found that they gained in weight as compared with control animals, lived longer, and upon examination presented evidence of arrest or cure of the disease. Koga,[2] working with preparations of copper, also obtained good results, and many other similar experiments could be quoted. It is significant, however, that none of these remedies have found permanent favour in the treatment of human tuberculosis, and it is therefore necessary to scrutinise very carefully the experimental evidence upon which their alleged value is based.

Two assumptions seem to underlie all these experiments: (1) That all guinea-pigs react in the same way to the tubercle bacillus, and (2) that fibrosis, or healing, of local lesions indicate with certainty the cure of the individual. Both these assumptions are false, as I shall hope to show, and the failure to recognise this is sufficient to explain the disagreement between the clinical and the experimental results. (1) The reports of the Royal Commission on Tuberculosis[3] make it clear that individual guinea-pigs differ among themselves in their reaction to *B. tuberculosis*. In one experiment ten guinea-pigs, inoculated with a strain of human tubercle bacilli, died of tuberculosis in periods ranging from 46–151 days. In another, 30 animals inoculated with a slightly virulent human bacillus died in periods ranging from 39–244 days. (2) A knowledge of human pathology throws doubt on the second assumption, for it is a commonplace of the post-mortem room to find fibrosed and encapsuled caseous tuberculous lesions in the lungs or other organs associated with an acute local or generalised exacerbation of the disease, though a careful microscopic examination of such lesions often reveals that an active though indolent form of tuberculosis is present at some part, usually the periphery, of the "healed" focus. These broad facts of human pathology are generally recognised, but pathologists are less well informed about the actual course of tuberculosis in guinea-pigs. These animals are usually only infected experimentally for purposes of diagnosis, and not with the object of studying the actual progress of the disease in them. Therefore, if they are to be used as subjects for the investigation of the therapeutics of tuberculosis, it is essential to establish standards by which it is possible to control the results; for if we have not accurate knowledge of the actual progress of the infection in the normal animal, it is impossible to estimate the value of any particular form of treatment.

The most recent remedy suggested for the treatment of tuberculosis is the defatted or "diaplyte" antigen described by Prof. G. Dreyer.[4] Injected into rabbits, this antigen caused the appearance of various immune substances in the blood of the animals, while used therapeutically on tuberculous guinea-pigs and rabbits it gave encouraging results. In the author's words: "Treatment with the 'defatted' antigen brings about a definite improvement, both general and local, in animals infected with *B. tuberculosis*. Additional evidence for this view is given by the guinea-pig No. 27 which died, for its organs show what seems indubitably to be a healing of tuberculous lesions."

Although the scope of Dreyer's paper extends much beyond the limits of the treatment of tuberculosis, it was this aspect of his work which chiefly aroused interest, and obviously demanded immediate consideration. Now, the final test of any therapeutic measure must be its effect upon the health of the average patient. No demonstration that, by all the rules, it ought to cure the patient is of any avail unless, in fact, it does; for, as Calmette[5] says: "Antibodies cannot be regarded as the essential element in the defence against tuberculous infection." Therefore that part of Dreyer's paper which deals with the actual treatment of tuberculous animals transcends in importance the larger, serological part, interesting though this is, and I do not propose to discuss either the general immunological considerations raised by him or the intrinsic merits of the diaplyte antigen.

The Evidence for the Value of the Diaplyte Antigen.

It is, of course, notoriously difficult to estimate the value of a therapeutic agent, for the control of the various factors in the experiment may be quite impossible, and it would be unsafe and unjust to condemn any form of treatment on clinical evidence alone without giving it an extended and sympathetic trial. On the other hand, we may justifiably demand that there should be reasonable grounds for believing the treatment to be efficacious before we are asked seriously to consider it. A critical examination of Dreyer's paper provides really little evidence of the value of his antigen as a curative agent. The rabbit experiments scarcely need to be considered, for the details given are much too meagre to enable the reader to form a definite opinion of the value of the treatment, and, further, that animal which showed the most severe lesions was chosen to be the control.

Duration of Life.—The four guinea-pigs used were inoculated with a culture of low virulence which, it is stated, usually killed the animals in from four to ten months with generalised tuberculosis. Two, Nos. 27 and 28, were the survivors of a batch inoculated on April 20th, 1922, while No. 26 was probably infected about this date. No. 4 was infected on June 15th, 1922. One animal died 50 weeks after infection, but the others were alive on May 18th, 1923, and had therefore lived longer than the general run of animals infected with this particular strain of bacillus; though not, so far as we know, longer than it is possible for untreated animals infected with this particular strain to survive, especially if we suppose, as it is not unreasonable to do, that they were specially well cared for. In these experiments improvement was noted in the condition of the local lesions, and the palpable glands diminished in size, but this is not conclusive, for it may happen in untreated animals which survive for any time, and is not an indication of actual cure.

Weight.—Dreyer lays stress on the weight of the animals as an indication of their general health. "In an animal of this species, the weight is the best indication of the general condition of health." One of the animals became pregnant, and its weight is not recorded. Of the others, No. 4 weighed 630 g. at the beginning of treatment, and 946 g. after 20 weeks, the end of the period recorded, an increase of 50 per

* Being a paper read at the Pathological Society of Great Britain and Ireland on Jan. 4th. This work was done under a research grant from the Medical Research Council.

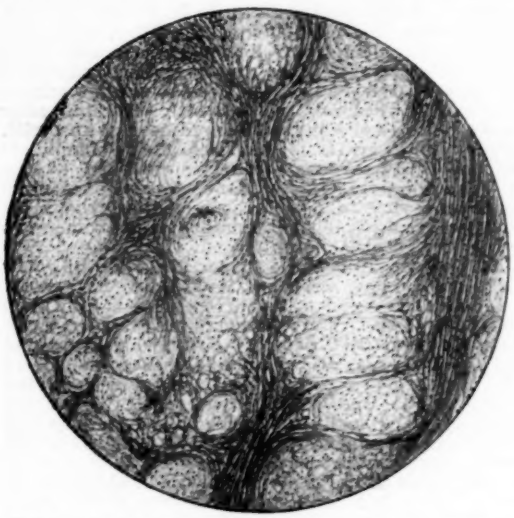


FIG. 1.—Tracheal gland. Guinea-pig No. 10, 5A. Showing extreme fibrosis and areas of endothelial proliferation.

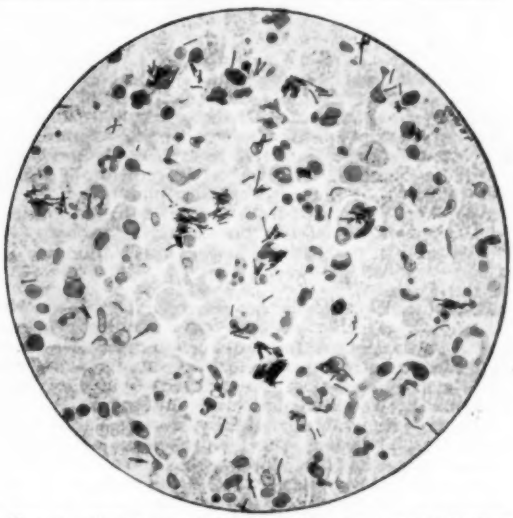


FIG. 5.—High-power drawing of the centre of the largest focus in Fig. 4. Showing contents of abscess with large numbers of tubercle bacilli.

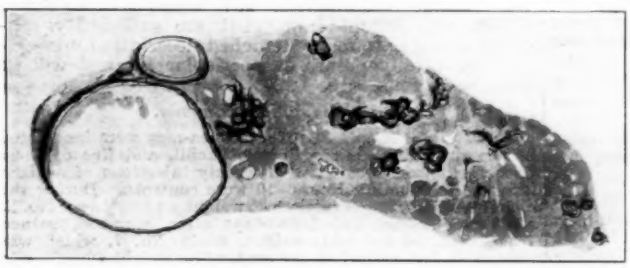


FIG. 2.—Low-power drawing of a section of the liver from guinea-pig No. 10, 5A. Showing cystic dilatation of bile-ducts and coarse fibrosis.

FIG. 4.—Low-power drawing of a section of the lung from guinea-pig No. 10, 5A. Showing fibro-caseous tuberculosis.

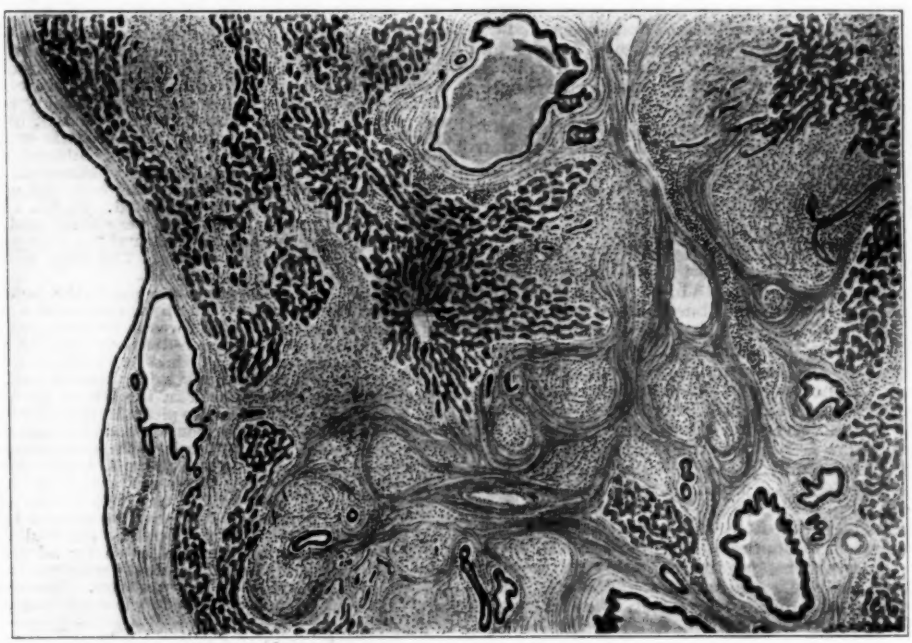


FIG. 3.—Higher magnification of Fig. 2 including part of the wall of the large cyst. Showing extreme fibrosis with destruction of liver tissue and dilatation of bile-ducts. There is some new bile-duct formation which is often a prominent feature in these livers.

cent. No. 26 weighed 813 g. at the beginning of the 16 weeks' treatment, and 840 g. at the end, an increase of 3 per cent.; while No. 28 lost 34 g., or 6 per cent. of its weight in the same time. Quite as favourable results as these may be seen in untreated animals. Finally, one of the animals died, and was subjected to careful naked-eye and microscopical examination. It showed lesions which were interpreted as indicating a tendency to healing. But no description of similar investigations of untreated guinea-pigs are given for comparison, and the results which I have obtained lead me to believe that these findings may occur equally well in untreated tuberculariscd animals.

Object of Present Experiments.

The author's authority, however, combined with the support of other workers, gave reason to believe that a more potent immunological agent was now available, and my experiments were undertaken with the object of studying the differences in the tissue reactions between treated and untreated animals. I was not hopeful of actually curing tuberculous guinea-pigs, because the experiences of vaccine therapy suggest that dosage is the all-important factor, and I did not expect to be able to regulate the treatment successfully except after a considerable period of trial and error; but I hoped to produce such alterations in the tissue reactions in the animals, possibly in an unfavourable direction, as might be a help to me in the line of work upon which I was engaged. My experiments have not hitherto been successful in this respect, but they have brought out very clearly the need for a radical change in the generally accepted standards by which failure or success of therapeutic experiments on tuberculous guinea-pigs are judged.

Turning to the actual experiments on which these conclusions are based, in the first two, 5A and 6A, I used a strain of human tubercle bacilli given me by Dr. W. E. Gye, and the antigen employed was No. 58, given me by Captain S. R. Douglas, who himself had received it from Dreyer. Experiment 11A was carried out with bacillary emulsion and diaplyte antigen prepared in the Inoculation Department of St. Mary's Hospital, and the animals were infected with the "Lyons" strain of human bacilli obtained from the same source. The first experiment was completed, the second far advanced, when Captain Douglas, who in the meantime had himself been working with antigen 58, informed me that he had come to the conclusion that it was not an entirely satisfactory sample. As tests of the value of the antigen in treatment these experiments, therefore, do not carry any particular weight, but as I have explained, I should not in any case be prepared to pronounce judgment on any therapeutic agent without a much more prolonged trial, and I am quite content to regard all the animals in these two experiments as controls.

General Plan of Experiments.

The general plan of the experiments was as follows. The guinea-pigs were inoculated in the right flank with a fine suspension of tubercle bacilli in normal saline. Care was taken to ensure that the suspension was uniform, so that approximately the same dose was administered to all the animals in each particular experiment, but no attempt was made to determine the actual number of bacilli introduced. Animals of varying weight were chosen purposely, so as to compensate as far as possible for the lack of absolute knowledge of the appropriate dose to be administered. In each experiment the animals were divided into approximately equal batches, one of which served as the control. The treated animals received at intervals of usually a week, subcutaneously into the left flank, a dose of antigen corresponding roughly in amount to the dose used by Dreyer in his experiments. For the most part, the animals have been allowed to die naturally, but some were killed, either because they were obviously very ill or for histological purposes. The animals were weighed, and their weight was charted, usually at weekly intervals. Careful post-mortem examinations were made in every case, and, as a routine, the local lesions, the iliac, periportal and tracheal glands, the livers, spleens, and lungs were microscoped; other tissues and glands were cut where it seemed advisable. The animals invariably developed large local lesions which ulcerated after three or four weeks and discharged caseous material. Only in one or two cases did these ulcers completely heal, though occasionally they diminished to the size of a millimetre or so. Even the healed ones broke down again before death occurred, and the most usual lesion was a dry granulating area, sometimes covered by a scab.

Inasmuch as I was merely concerned with the study of the tuberculous lesions, I have made no general bacteriological examination of the animals, and it is quite possible that many of them died of intercurrent infection; indeed, this is obviously what happened in the early deaths occurring in Experiments 6A and 11A.† But every guinea-pig infected with living tubercle bacilli presented progressive tuberculosis post mortem. Usually the post-mortem findings had a monotonous sameness. The iliac, periportal, and tracheal glands were invariably affected, as were often the left inguinal, the right axillary, and the cervical glands. The left axillary glands were less often involved. The lungs, livers, and spleens were always affected, though to a varying degree. Great enlargement of the liver and spleen with massive infarction were very general findings. It is hoped that the charts of the experiments appended are sufficiently self-explanatory as to make detached description unnecessary, and only points of particular interest will be dealt with.

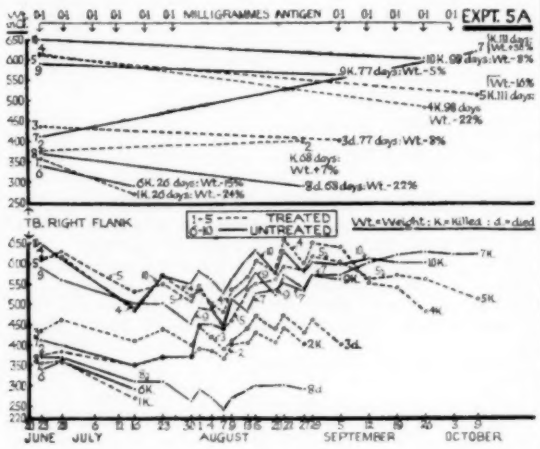
Details of Experiments.

Expt. 1 (5a) (Chart 1).—Ten guinea-pigs were inoculated in the right flank with tubercle bacilli, and five of them (Nos. 1–5) were treated with weekly injections of antigen into the left flank; Nos. 6–10 were controls. During the experiment all the animals lost weight except two; No. 2, a treated animal killed 68 days after injection, gained 7 per cent. of its body-weight, while No. 7, which was untreated, had gained 50 per cent. of its weight when it was killed, 111 days after injection. In the early weeks of the experiment all the animals lost weight. This period coincided with a spell of very hot weather, but the main cause of the loss of weight was undoubtedly imperfect feeding. This is well brought out on the chart during August, when the weights were taken on Mondays and Wednesdays. Invariably there was a fall in the weights on Monday, due to lack of care during the week end, but this was made up by the Wednesday. All of the first six guinea-pigs dying or killed showed progressive tuberculosis. The disease was most advanced in No. 8, which was always a weakly animal, but except for some minor variations in the extent to which the different organs were involved, there is little or nothing to choose between the rest. The chief interest centres in Nos. 4 and 5 (treated) and 7 and 10 (untreated); 4 and 5 both lost weight rapidly towards the end, and when killed were found to be extremely emaciated. In No. 4 the lymph nodes throughout the body were very small and hard, the spleen was shrivelled and scarred, and the liver was firm on section and apparently cirrhotic. The lungs were studded with rather small fibrous tubercles.

In No. 5 the appearances were much the same, but the spleen was a trifle larger; the liver contained a small cyst, and in the lungs the infection was more advanced and there was a condition of active sero-fibrinous pleurisy at the left base. Microscopically both these animals showed a very chronic form of tuberculosis with fibrosis and scarring. This is particularly well seen in the lymph glands, though even here small cellular foci are plentiful among the organised fibrous tissue, and small caseous areas are occasionally to be seen. The spleen shows fibrosis with areas of calcification, but active cellular foci are also present, and in these organs, as in the lymph glands, bacilli can easily be found. The hepatic lesions in both animals are very similar, consisting of a coarse portal cirrhosis, with active cellular tuberculous foci. The fibrosis obviously represents the healing stage of a tuberculous inflammation, and is so far advanced as to cause obstruction of some of the ducts, with cystic dilatation of their lumina behind the obstruction. The cyst in the liver of No. 5 is such a dilated bile-duct, but its wall is

† Interesting modes of death which have been encountered are hæmorrhage from an acute gastric ulcer, 6A/16 and 11A/5; and rupture of vessels of enlarged spleen, usually caused by holding animal for inoculation.

largely formed of granulation tissue, containing many tubercle bacilli. Scanty bacilli can also be found in the lesions elsewhere in this liver and in that of No. 4. The lungs in both animals show advanced tuberculosis. Often the lesions are cellular and there is much fibrosis, but there are also large caseous areas. In many parts there are

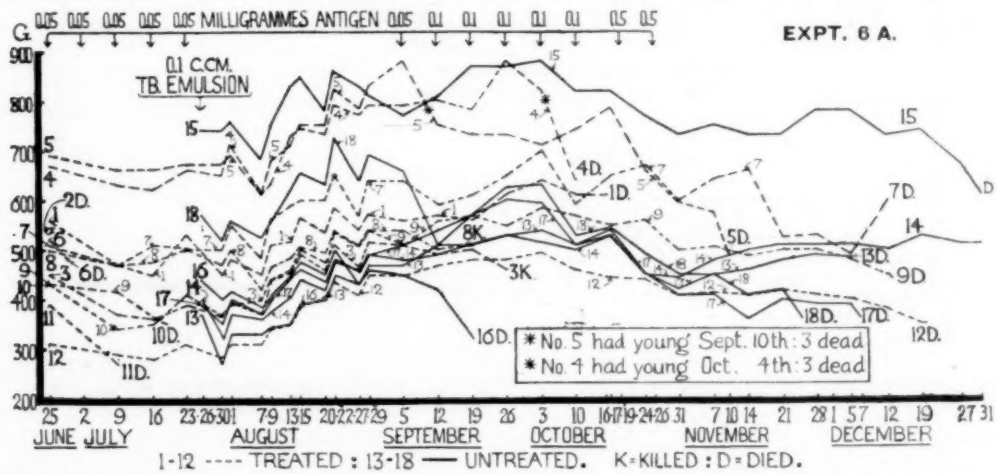


numerous bacilli and at the base of the lung in No. 5 there are enormous numbers of them. In both animals the local lesions were ulcerated, but scarred and fibrous, though tubercles could be made out at the periphery, and the microscopic preparations correspond with these appearances. There is in these animals, then, definite evidence of healing. The local lesions show retrogression and repair, and in other organs it is clear that a much more active and extensive tuberculosis must at one time have been present. Healing in one part, however, is associated with active progress of the disease elsewhere, as is especially well seen in No. 5.

Even more interesting are the control animals, Nos. 7 and 10. In both these the lymphatic glands throughout the body were very large but intensely fibrous, and though bacilli can be found in them they are scanty, and the histology is that of an inflammatory lesion in the healing or fibrosing stage (Fig. 1). In No. 7, which was a well-nourished animal, the lesions in the liver, spleen, and lungs are very similar to those in No. 4, the only practical difference between the two being the much greater size of the lymph nodes in No. 7. In No. 10, however, the fibrosis of the liver noted in Nos. 4 and 5 had proceeded to a much more advanced stage. The liver was considerably increased in size and in its substance and projecting from its surface were numerous cysts (Figs. 2 and 3), containing bile-stained material or clear fluid. Rupture of one or more of these cysts had given rise to a condition of diffuse plastic peritonitis. These cysts are retention cysts of bile-ducts due to the constriction of contracting fibrous tissue. The process is exactly similar to that noted in No. 5, though much more advanced, but I have not found active tuberculosis in any of the cysts in this liver, nor have I found more than a very few bacilli in any of the indolent fibro-cellular lesions which are scattered throughout the organ. It is fairly certain that natural healing was occurring in this liver, though it was at one time much more extensively involved than were the livers of either of the other three animals. Nevertheless, in the lung, which shows microscopically characteristic fibro-caseous tuberculosis (Figs. 4 and 5), active foci with very large numbers of bacilli are present.

Conclusion.—Reviewing the experiment as a whole it may be said that it demonstrates above everything else that fibrosis and natural healing may occur in guinea-pigs infected with tubercle bacilli without any form of treatment at all. But this healing does not indicate more than a local reaction, for in other parts of the body the process is progressive. Inasmuch as the particular sample of antigen used is not regarded as entirely satisfactory, the experiment does not afford data for any expression of opinion as to the value of this form of treatment. If any potency is to be ascribed to the antigen, stress might be laid on the very distinct difference in the involvement of the lymphatic glands in the treated and the untreated animals. But if the treatment is held to be responsible for this, the benefit to the animals is obviously purely local, for the disease is progressing actively elsewhere, notably in the lung of No. 5. If, on the other hand, it is held to that the antigen is worthless, the guinea-pigs Nos. 4 and 5 afford examples of the natural local retrogression of tuberculosis in these animals.

Exp. 2 (6a) (Chart 2).—In this experiment an attempt was made to immunise guinea-pigs before infecting them. Twelve animals of varying weights received weekly injections of antigen for five weeks. At the end of this time four had died, but the eight survivors, together with six controls, were inoculated subcutaneously with a culture of human tubercle bacilli. After an interval of a month the treatment was continued. By the middle of October four of the treated animals had died or been killed, and the remaining four were given two large doses of antigen, exhausting my supply of the particular sample, which by this time had been discredited. They were subjected to no further treatment. All the animals were allowed to die naturally or were killed when moribund. The weight chart is highly irregular and periodic falls, due to bad feeding, are obvious. It will be noticed how closely these variations correspond in the treated and the untreated animals. If anything, the treated animals appear to have been adversely affected by the antigen: the average duration of life was shorter in them than in the controls, one of which is still alive 158 days after infection, but, on the other hand, there was no immediate response to the two last massive doses of antigen, such as might have been expected.



Conclusion.—The experiment demonstrates how widely individual guinea-pigs may differ in their response to infection with tubercle bacilli. In

all the animals the disease was generalised, but the degree of involvement of the different organs varied considerably in different animals. There is, for example, abundant evidence that tubercle bacilli invariably reached the liver quite early in the infection, yet the hepatic lesions in different animals varied enormously in extent and intensity. And the same picture of retrogression in one place, with active progression elsewhere, is seen in this experiment as in the previous one. One untreated animal, No. 17, resembles in its lesions almost exactly the treated animals 4 and 5 of the first experiment. There is the same shrinking and scarring of the lymph nodes throughout the body, and the same fibrosis of the liver and spleen; but pulmonary foci show enormous numbers of bacilli. Quite often active tuberculosis with demonstrable bacilli can be seen in an organ, together with advanced fibrosis and old caseation with calcification. And a careful examination of the animals in this experiment demonstrates beyond doubt that much more stringent standards of cure must be demanded than have been accepted in the past before cure of tuberculosis in guinea-pigs can be claimed.

TABLE I.

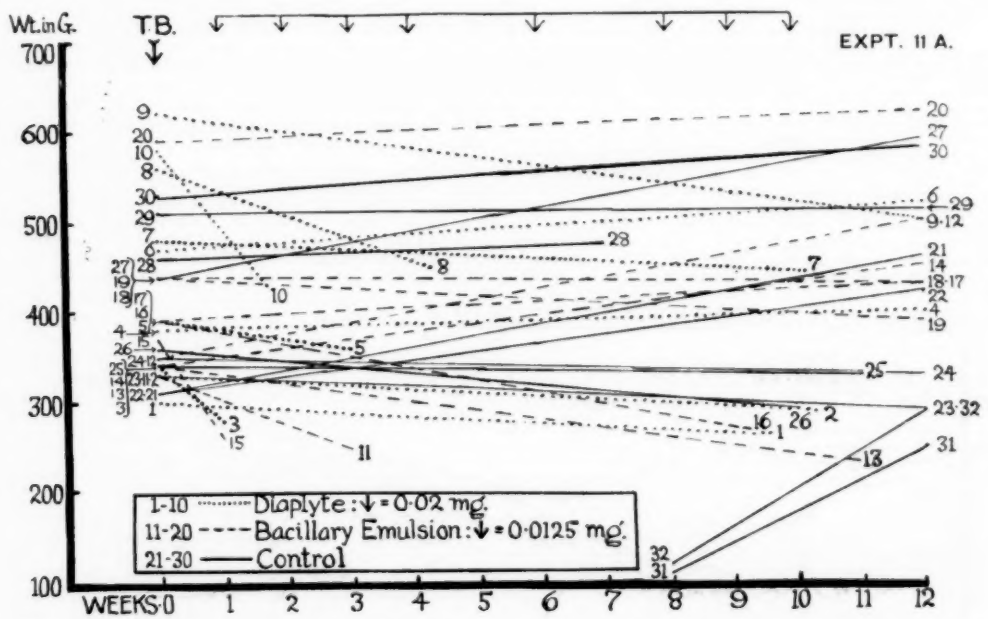
A = diaplyte. B = B. emulsion (tuberculin). C = controls.

—	Average weight in g.		Average loss or gain in g.	Average duration of life. Possible maximum 84 days.
	At beginning of exp.	At end of exp.		
A, 1–10	445	394	−51 (−11·2 %)	53·2
B, 11–20	398	382	−16 (− 4 %)	67·4
C, 21–30	394	424·5	+30·5 (+ 8 %)	78·4

TABLE II.—*Boars Alone.*

A, 1–10	418·7	374·4	−44·3 (−10·5 %)	47·1
B, 11–20	375	346	−29 (− 8 %)	63·0
C, 21–30	364	371	+ 7 (+ 1·9 %)	72·8

Conclusion.—As in the previous experiments, it has not been possible to distinguish absolute differences between treated and untreated animals. The local lesions and the palpable glands in the living animals are all in much the same condition, and no striking differences have been seen in the naked eye or microscopic lesions in those which have died.



Exp. 3 (11a) (Chart 3).—In this experiment 30 guinea-pigs were inoculated with human tubercle bacilli and divided into three equal groups; 1–10 were treated with diaplyte antigen (St. Mary's), 11–20 with bacillary emulsion (tuberculin), and 21–30 were used as controls. Inasmuch as the experiment has only lasted 12 weeks, too much cannot be claimed from it. Adopting the criteria of the duration of life and the body-weight, it will be seen that the best results are in the untreated guinea-pigs, and the worst in those treated with the diaplyte. The differences may be expressed in tabular form by averaging the weights and duration of life (Table I). At the end of 12 weeks 3 animals were alive in group 1, 6 in group 2, and 7 in group 3.

A possible fallacy in Table I. lies in the fact that some of the animals still living are sows, and therefore pregnancy cannot be absolutely excluded, though the animals have been segregated as far as possible. No. 7 when examined was found to contain three very early embryos, and No. 20 gave birth to two healthy animals, Nos. 31 and 32, in the eighth week of the experiment, since when she has been kept in a separate cage. But eliminating the sows, the figures show much the same results, though the figures for the control animals are most severely affected by this procedure. The figures for boars alone are given in Table II.

Evidence of healing can be found in many of the animals, though not to such an advanced degree as in the previous experiments in which the animals were examined at a much later date after infection.

General Survey of Results.

The conclusion which can be fairly drawn from the experiments is that the evidence which is usually brought forward in demonstration of the cure of tuberculosis in guinea-pigs is invalid. Such indications of healing as have been described occur naturally in untreated animals; further, they do not indicate any increased resistance to the tubercle bacillus in the animal itself, for they are local in their manifestations, and are associated with the progress of the disease elsewhere in the body. The original observations in support of Dreyer's treatment are, in the absence of adequate controls, quite inconclusive, and the question whether or not this antigen is of value in the treatment of tuberculous guinea-pigs can only be answered by further experimentation. In my experiments it has not been possible to demonstrate any curative action of the diaplyte antigen. There is, however, a good deal to suggest that the antigen had an adverse action on

the guinea-pigs treated with it, even in comparison with bacillary emulsion. It is possible that a different and favourable result might have been obtained by more careful dosage, although this is mere supposition.

We recognise every day in the post-mortem room healed tuberculous lesions in the caseous but completely encapsuled focus, the calcareous gland, and the scarred and puckered lung. It may be that such a lesion actually contains living and virulent tubercle bacilli, yet if it is securely encapsuled and shut off from the rest of the body it is regarded as a healed lesion. If, on the other hand, a progressive even though slow reaction of the surrounding tissues indicates that the lesion was still active it cannot be said that the patient was cured in respect to this particular infection, for we know from experience the readiness with which such latent foci may light up.

If such stringent criteria of cure are demanded for the human being, there is no reason why a lower standard should be accepted for the guinea-pig, especially when it is remembered that these animals are used in such experiments as have been discussed in this paper actually as indicators.

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2. Jour. Exp. Med., 1916, xxiv., 107.
3. Part II., Appendix, vol. i., 1911, p. 39 et seq.
4. Brit. Jour. Exp. Path., 1923, iv., No. 3, 146.
5. Tubercle Bacillus Infection and Tuberculosis in Man and Animals, Williams and Wilkins, Baltimore, U.S.A., 1923, p. 561.

SERUM DIAGNOSIS IN SYRIA:

AN ANALYSIS OF 2868 CASES.

BY E. H. R. ALTOUNYAN, *M.C.*, M.D., B.CH. CAMB.

(*Abstract of M.D. Thesis.*)

THE following account is an abstract of work undertaken between 1921 and 1923 to estimate the value of serological tests in syphilis, tubercle, dysentery, typhoid, and typhus for the population in Syria. The clinical diagnosis has been confirmed by Dr. A. A. Altounyan, of Aleppo.

1. *Serum Diagnosis of Syphilis.*

(*a*) *Wassermann Reaction.*—This reaction was tested in 1783 cases, with Rochester Row technique, and heart cholesterin antigen prepared by Dr. E. L. Kennaway. The series under consideration covers a period of two years (1921–23); it includes the sera of 1783 individuals and is exclusive of controls and re-testings. The age of subjects ranges from 11 months to 75 years; all tests were performed by the author, using a uniform technique. The bulk of material was obtained from hospital out-patients; normal sera were obtained from the hospital staff, the free clinic, and in-patients awaiting major operations. In order to economise time and material and to minimise the risk of gross errors, which under the circumstances could not be checked by another laboratory, the reaction was carried out once a fortnight and the number of sera to be examined was maintained at a minimum of 50. In instituting the Wassermann reaction (W.R.) in Aleppo, it was considered desirable to estimate the percentage of positive results likely to be obtained from the routine examination of patients presenting themselves at the hospital. Owing to the great prevalence of malaria, it was thought necessary to endeavour to appraise its effect on the W.R. Of 1263 cases taken from persons not suffering from acute malaria or exhibiting gross signs of chronic malarial infection, 13·5 per cent. were found to give a positive W.R. In two cases in which the blood examination was repeated with contradictory results, no clinical evidence of syphilis was found. In the remainder, the diagnosis of syphilis was substantiated by physical stigmata or the results of anti-syphilitic treatment. This percentage of active syphilitics is comparable to the figures given by workers in France, England, and America. Of 135 cases suffering from obvious signs of chronic malarial infection, 11 per cent. were found to give a positive W.R. It may be assumed therefore that chronic malaria has no appreciable effect on the W.R. Of 21 cases of acute malaria, confirmed by the examination of the peripheral blood, 2 cases, or 9·5 per cent., gave a positive W.R. The anti-complementary phenomenon observed by other workers was well seen in 6 cases (30 per cent.). Of 152 cases taken from the venereal clinics, 48 per cent. gave a positive and 21 per cent. gave a suspicious reaction. These cases were examined as a test of the sensitiveness and accuracy of the general technique. Three cases of leprosy and 1 case of sleeping sickness (*Trypanosoma gambiense*) all gave negative reactions. Eight cases of pyrexia, due to infection with various organisms (non-malarial), all gave negative reactions.

TABLE I.—*Results Obtained in the Sera of 1783 Individuals Examined by the W.R. (Rochester Row Technique) at Aleppo.*

Groups.	No. of cases.	Positive.	Weak positive.	Doubtful.
		Per cent.	Per cent.	Per cent.
I. General	1263	13·5	9·1	—
II. Malarial (chronic)	135	11	12	—
III. Acute malaria ..	21	9·5 (2 cases)	30 (6 cases)	—
IV. Orphanage ..	212	26·8	14	—
V. Venereal clinics ..	152	48	10	11

N.B.—For practical purposes no reading less than "Positive" is considered as significant. In the case of known syphilitics, "Weak positive" and "Doubtful" readings are considered to be indications for the continuance of treatment.

Conclusions.—(1) Chronic malaria has no appreciable effect on the W.R.; (2) acute malaria has an undoubted effect in increasing the anti-complementary powers of the serum (if this is borne in mind, "false" positives will be of very rare occurrence); (3) pyrexia, due to non-malarial infection, has no effect on the W.R.

(*b*) *Sigma Reaction.*—This reaction was tested in 227 cases. Dreyer-Ward technique. Antigen prepared by Dr. H. K. Ward, of Standards Laboratory, Oxford. It was found impossible to carry out a large series of comparative tests by both methods, and in view of the work already published this does not seem to be of first importance. A sufficient number of comparative tests were done, and compared with the clinical findings, to satisfy the author that his interpretation of the technique was approximately correct. The sera of 227 individuals were tested. Of these 67 proved positive and 160 negative; 16 cases of discrepancy between the two methods occurred. In three instances the balance was in favour of the W.R., and in two instances in favour of the Sigma reaction (S.R.). One case of leprosy was returned as positive (2·6 units). A special study was begun on syphilitics under treatment, and the results in 10 cases (involving 52 tests) accord with those published by the Medical Research Council.

Conclusions.—(1) The S.R. appears to be of as great diagnostic value as the W.R.; (2) the technique of the S.R. is simpler, but the reading of results requires greater care and experience; (3) in the study of syphilitics undergoing treatment, the S.R. is undoubtedly the method of choice; (4) in the serum diagnosis of syphilis, workers will continue to use both methods in the elucidation of difficult cases; (5) the possible influence of malaria, leprosy, yaws, &c., requires careful investigation.

2. *The Complement-Fixation Test for Tubercle.*

Technique.—Besredka's antigen,[1] 501 cases. As for W.R. with following modifications: Serum not diluted, complement used 3, 4, 5, 6 M.H.D. Incubation time one hour at room temperature, one hour at 37° C. in incubator. Readings taken at once. The antigen was used undiluted, 1·5 unit volume to each tube. I subjected 501 cases to the complement-fixation test; the results agree in the main with those of

[1] For Besredka's antigen see Annales de l'Institut Pasteur, 1921, xxv., 291.

seven observations by other workers given in Table III. Table IV. compares my results with those of Rieux and Bass, also using Besredka's antigen and working with the same technique. It will be observed that in each case the highest percentage of positive readings is obtained in cases of pulmonary tuberculosis with positive sputa. In each case tuberculous peritonitis cases give low readings. The percentage of "false positives" is approximately the same. There is a striking difference in the percentage of positive results given by cases of pleural and glandular infection.

TABLE II.—*Analysis of the Complement-Fixation Test for Tubercle in the Sera of 501 individuals.*

—	No. of cases.	Positive.	Weak positive.	Negative.	Percentage of positive weak positive.
Pulmonary tuberculosis (sputum positive for T.B.)	23	17	4	2	91
Pleurisy (with effusion) ..	11	9	0	2	82
T.B. abdominal	21	13	1	7	66
T.B. bones	38	28	2	8	79
T.B. glands	29	19	5	5	83
T.B. larynx	5	3	0	2	60
T.B. suspect	98	76	14	8	91
Undiagnosed (? T.B.) ..	37	26	1	10	73
Lupus vulgaris	12	7	3	2	83
Asthma	9	4	1	4	55
Leprosy	3	3	—	—	—
Encephalitis lethargica ..	3	2	1	—	—
Lateral sclerosis	1	1	—	—	—
Typhus	1	1	—	—	—
Typhoid	1	—	—	1	—
Hodgkin's disease	1	—	—	1	—
Small-pox	1	1	—	—	—
Banti	1	1	—	—	—
Rodent ulcer	1	1	—	—	—
Trypanosomiasis	1	1	—	—	—
Albino	1	1	—	—	—
Normal	203	27	23	153	14*

* Including syphilitics, 24 per cent.

TABLE III.—*Results Obtained by Various Workers with the Complement-Fixation Test for Tubercle.*

Author.	Antigen.	Tuberculous.		Non-tuberc.	
		No. of cases.	Positive percentage.	No. of cases.	Positive percentage.
H. Von Wedel.	Wilson's.	484	69·8	539	1·7
Stivelman.	Miller's.	592	52	108	24
Watkins and Boynton.	Miller's.	1103	78	168	4·2
Rieux and Bass.	Besredka's.	156	75	148	11·5
L. Kempner.	Besredka's.	131	82	57	3·5
Sellers and Ramsbotham.	Wang and Crockett's.	85	71	50	0
A. L. Punch.	Fresh bacillary emulsion.	181	100	205	2
E. H. R. Altounyan.	Besredka's.	274	83	203	14*
Average for eight workers ..		3006	76	1478	8

* Excluding syphilitics.

TABLE IV.—*Results Obtained by Two Observers Working with Besredka's Antigen.*

—	Rieux and Bass.		The author.	
	No. of cases.	Positive percentage.	No. of cases.	Positive percentage.
Pulmonary tuberculosis ..	78	98	23	91
T.B. peritonitis	6	66	21	66
T.B. glands	44	45	29	83
Pleurisy	28	57	11	82
T.B. suspect	80	64	98	91
Tuberculous (all cases) ..	156	75	274	83
Normal	148	11·5	203	14

N.B.—These results are strictly comparable except in the class labelled "T.B. glands." The author's cases were all lymphatic infections of the neck, axilla, or groin, while Rieux and Bass's figures are confined to bronchial gland infections.

As an outcome of the experience gained in these cases, I submit the following reflections:—

1. The time allowed for the fixation of complement must be ascertained accurately by experiment for each technique. It can be assumed that this will certainly be longer than that required in the W.R. At present I allow two hours. An extension of this time, as suggested by Aronson and Lewis, would possibly be advantageous. At the same time the percentage of "false positives" obtained (14 per cent.) is already considerably higher than the average. Allowance might be made in the readings in view of the compensating advantages of a more stable fixation.

2. Workers in France, England, and America agree that the highest percentage of positive results is obtained in cases where the diagnosis of tuberculosis is based on the finding of tubercle bacilli in the sputum. Such a conclusion is highly satisfactory. It is, however, to be regretted that the classification of cases according to the site of the tuberculous lesion is not more frequently made.

3. The cross-fixation phenomenon with syphilitic sera is a serious factor in all tests where the Besredka antigen or whole tubercle bacillus emulsion is used. In 29 of my syphilitic cases there were 20 cross-fixations with the tuberculous antigen.

4. The effect of hyperpyrexia on the reaction requires further elucidation. Four cases of the author's (all positive), occurring in the course of typhus, typhoid, small-pox, and sleeping sickness, suggest that this may prove a source of error.

General Conclusions.—(1) It is impossible to say, by a consideration of the general physique, or a detailed examination of the particular focus of disease, whether, in any given case, we are likely to find a plentiful or scanty production of antibodies in the blood; (2) it may be hazarded that, on the whole, we are likely to obtain a strong reaction in an incipient case and a weak or negative reaction in a terminal case of tuberculous infection, but the exceptions to this dogma are many, and reliance on it may occasionally prove dangerously misleading; (3) the phenomenon of the non-specific cross-fixation of complement appears to be due to the employment of whole tubercle bacilli in the preparation of the antigen. On extracting the bacilli with alcohol and ether, the sensitiveness of the antigen may, to some extent, be impaired.

3. *Serum Diagnosis of Chronic Bacillary Dysentery.*

In this series 181 cases were tested, Dreyer's standard cultures of Shiga and Flexner V, W, X, Y, Z being used (incubation four and a half hours in water bath). The classification of normal and dysenteric individuals adopted in the accompanying tables is necessarily arbitrary. Few persons living in the near East escape, at one time or another, an attack of acute intestinal catarrh. The amœbic and bacillary types seem to be about equally prevalent. A "normal" individual is taken as one who at the time of examination (and within recent memory) is not suffering from some chronic intestinal disorder. The "dysenteric" patient is not so classified until he has undergone a thorough examination, including an investigation of stools for amœbæ and parasites, and a search in the blood for malarial plasmodia. In short, persons suffering from chronic intestinal instability in whom malaria, amœbic dysentery, and the presence of large numbers of intestinal parasites have been excluded, are classed for the purposes of this investigation as chronic dysenterics. The longest period of debility in this series is 20 years. The experience gained in one case of two years' standing, cured by the administration of santonin and the expulsion of large numbers of round worms, has led to the routine administration of a vermifuge before proceeding to the more elaborate investigation of any patient.

The comparisons between the normal and dysenteric groups is given in Table V. Taking 10 agglutinin units as the minimum standard of positivity, it will be found that normals show 38 per cent. and dysenterics 74 per cent. of positives. If the sexes are differentiated, it will be seen that females give a considerably higher percentage of positives (both in the dysenteric and normal group) than males.

In the dysenteric group, the relative importance of the types of bacillary infection is shown in Table VI.

It will be observed that Flexner Y is by far the commonest, and then W, while V, X, Z and Shiga occur with about equal frequency. On contrasting the normal and dysenteric groups in respect of the six types of dysentery bacilli, we observe (1) that over 10 agglutinin units obtained with Flexner W or Y may be regarded as suggestive; (2) that Flexner Z is very rarely met with in the normal group; (3) that reactions to Flexner X occur in about the same proportion with normal and dysenteric sera.

TABLE V.—*Number of Cases Giving 10 Units and over with any one of Six Types of Dysentery Bacillus (Shiga and Flexner Group).*

	No. of cases examined.	No. of cases giving 10 units and over.	Percentage of cases giving 10 units and over.
Normal cases (both sexes) ..	112	43	38
Dysenteric cases (both sexes)	67	50	74
Normal male cases	63	21	33
Dysenteric male cases ..	27	15	55
Normal female cases ..	49	22	44
Dysenteric female cases ..	40	35	87

TABLE VI.—*Percentage of Cases giving 10 Agglutinin Units (and over) when tested against* B. dysenteriæ, *Shiga and Flexner V, W, X, Y, Z respectively.*

Analysis of 181 Cases.

Male and female.	Normal.		Dysenteric.	
	No. of cases.	Percentage.	No. of cases.	Percentage.
B. dys. Shiga ..	5	4·5	10	13
B. dys. Flexner—				
V	5	4	9	13
W	13	11·5	23	35
X	16	14	10	16·6
Y	23	20	33	57
Z	2	1·7	11	16

Conclusions.—(1) The standard agglutination tests with the Shiga-Flexner group of dysentery cultures, though primarily designed as a supplementary aid in acute and subacute infections, may have a large field of usefulness in helping to determine the prevailing type of infection in the dysenterics of any given population; (2) that such an investigation may prove to be of more than academic interest is suggested by my experience in a few cases treated by dysenteric vaccines made up of organisms corresponding to the prevailing types (Thomson's detoxicated vaccines); (3) it is possible that the standard agglutination tests may be of value even in the diagnosis of chronic dysentery; though the series of single tests reported by the author is not, and cannot be, conclusive, yet it is reasonable to suppose that repeated tests on the same individual, in a large number of cases, may enable one to formulate some working hypothesis as to the relative significance of slight irregular variations in agglutinin values, obtained with a particular organism, in any given individual.

4. *Serum Diagnosis of Typhoid.*

In this series of 107 cases, Dreyer's standard cultures of *B. typhosus*, *B. paratyphosus* A and B, *B. enteritidis* Gaertner, and *B. aertrycke* were used. Incubation two hours.

1. Of 56 normal controls significant agglutinin values were recorded in 3 per cent. of cases. Of 51 cases of clinical "typhoid fever" 78 per cent. gave high agglutinin values with *B. typhosus* cultures, and there were four cases regarded as due to paratyphoid infections.

2. A consideration of Table VII. suggests that the population as a whole shows signs of having recently passed through a paratyphoid epidemic (probably paratyphoid B). There is a certain amount of evidence to prove that in the presence of an active *B. typhosus* infection paratyphoid agglutinins of a value which would not ordinarily be regarded as significant are raised and in some cases attain a value far exceeding that produced by the active infection.

3. A further consideration of these tables leads one to think that what is true of paratyphosus B is also true of the *B. enteritidis* Gaertner. It becomes apparent that there is a considerable Gaertner infection of the general population and that infection with *B. typhosus* raises considerably the value of its agglutinin residues.

TABLE VII.—*Agglutinin Values obtained with* B. typhosus, B. paratyphosus *A and B*, B. enteritidis *Gaertner, and* B. aertrycke *in 56 Normal Individuals and 57 Cases Diagnosed as Typhoid.*

Group.	Cultures.	No agglutination.		2–5 units.		5–10 units.		10–20 units.		20 units and over.	
		C	%	C	%	C	%	C	%	C	%
N	*B. typh.*	49	87	5	8·9	0	—	2	—	0	—
T	*B. typh.*	4	7·8	3	—	4	7·0	13	27	27	57
N	*B. Para.*	55	98	0	—	1	—	0	—	0	—
T	*typh.* A.	45	88	0	—	0	—	3	—	3	—
N	*B. para.*	50	89	3	—	3	—	0	—	0	—
T	*typh.* B.	41	80	1	—	0	—	1	—	8	17
N	*B. enter.*	49	87	0	—	5	8·9	2	—	0	—
T	Gaert.	40	78	0	—	3	—	4	7·8	4	7·8
N	*B. aer-*	53	94	0	—	0	—	3	—	0	—
T	*trycke.*	45	88	0	—	2	—	3	—	1	—

C = Cases. N = Normal. T = "Typhoid."
B. typh. = *B. typhosus.* *B. enter.* Gaert. = *B. enteritidis* Gaertner.

Note.—Of the five normal cases showing 2–5 units with *B. typhosus*, one is known to have had enteric ten years previously. Of the two normal cases showing 10–20 units with *B. typhosus*, one had a severe attack of typhoid five years previously, and the other six years before. Both were members of the hospital staff and were examined in the general course of routine. Neither give any signs or symptoms of ill-health. Stool cultures were not made. The remaining four cases giving 2–5 units with *B. typhosus* have not been accounted for.

4. The significant agglutinin value may be regarded as being one of a minimum of 10 units, though undoubted "typhoid" infections may occasionally register, even at an advanced stage of the disease, considerably lower readings.

5. Though positive hæmocultures were only obtained in five cases, in two of these it was the only means of distinguishing by a single test between typhoid and paratyphoid infections.

6. The coagglutination of *B. paratyphosus* B with *B. aertrycke* is very noticeable.

Summary.—(1) Even in populations where typhoid is endemic (as in Syria) single agglutination tests are of considerable value in diagnosis after the eighth day; (2) the phenomenon of coagglutination requires further study; (3) it is desirable in any investigation of the enteric group that agglutination tests should be made with as many organisms as possible.

5. *Serum Diagnosis of Typhus, Weil-Felix Reaction (B. Proteus X 19).*

Sixty-nine cases were taken from a small epidemic originating among Greek refugees in the autumn of 1922. The general population (immunised by the epidemic of 1916) escaped lightly. Dr. N. Ishkhanian interested himself especially in the working out of the technique, and many of the sera were collected by him at personal risk and inconvenience.

Technique.—1. The blood was collected in agar-lined tubes (A. D. Gardner's technique), according to the author's modification of Thompson's method. 2. The culture used was procured from the Lister Institute collection of type cultures. It was labelled Lister 67. In the laboratory it was maintained by sub-culture once a month at room temperature, after a preliminary 24 hours' incubation at 37° C. For the emulsion a fresh 18 hours' growth on agar was employed. 3. Bacillary emulsion: At first fresh emulsions of the live organisms were used, of an opacity corresponding to that of the standard cultures. Latterly it was found that emulsions of bacilli killed by exposure for one hour to 60° C. remained sterile, and preserved their sensitiveness for two months at least. All attempts to secure formalinised emulsions corresponding to the standard cultures failed. It was repeatedly found that

within a week such an emulsion would fail to agglutinate with even strong positive sera. 4. Dreyer's macroscopic technique was adopted throughout. 5. The time and range of temperature allowed for agglutination are important factors in the test. It was eventually decided that the best results were obtained by three hours' incubation at 37° C., followed by two hours at 54° C., the readings being taken next morning. 6. Controls: As it was impossible to obtain permanent emulsions of stable sensitiveness, special attention was given to checking the sensitiveness of each culture for each test by the use of the following controls: (*a*) A normal serum was tested in a 1 : 25 dilution. If agglutination occurred, then that particular batch of emulsion was rejected; and (*b*) the pooled serum of 10–15 typhus patients, known to give a strong agglutination titre, was preserved (in capsules and a series of small bottles) mixed with an equal volume of pure glycerine. Of this stock a 1 : 250 dilution (=1 : 125 of pure serum) was put up with each batch of sera to be tested. An emulsion was considered satisfactory if complete sedimentation took place in the tube containing the stock serum.

Results.—1. Of 57 typhus patients examined by the Weil-Felix reaction, 3 proved negative. Of these, 1 was lost trace of, 1 was examined after the crisis, and 1 proved positive on re-examination on the tenth day. The earliest authenticated day on which the reaction was obtained is the fifth, the latest four weeks from the onset. The highest effective dilution was 1 : 5000, the lowest 1 : 50. A large proportion reacted in dilution of 1 : 250 and more. 2. Of the 9 cases recorded as controls, there was one case of a doubtful reading (dilution 1 : 50) in a normal individual. In 3 cases of typhoid a negative reading was given. (It must be stated that many more normal controls than those given here were actually carried out, as it was the practice to include in each batch of tests at least one normal individual.) 3. I was unable to confirm the observations of K. Bauer on the effect of typhus serum on the W.R. 4. The effect of typhus serum on typhoid organisms was investigated in 3 cases with negative results.

Note.—The strength of the reaction does not correspond to the gravity of the disease. Mild cases may give strong reactions, but a high reading was also obtained in a patient shortly before death. There is no authenticated case in the literature of diagnosis having been made serologically before the fourth day. It should be possible for workers in countries where typhoid is endemic to ascertain the precise influence of typhoid agglutinins on *B. proteus*.

My thanks are due to Drs. Thoulons, Maire, Borel, and Chopin, of the French Medical Service; to Drs. Sabri Farah and Lutfi, of the Aleppo Venereal Clinics; and to Drs. N. Ishkhanian and P. Hovnanian for the supply of interesting clinical material. Dreyer's technique was carried out by Miss Bayramian and Miss Setyan working in the hospital laboratory. Much valuable advice was given by Dr. A. D. Gardner, of Oxford University.

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Medical Societies.

ROYAL SOCIETY OF MEDICINE.

COMBINED SECTIONS OF MEDICINE, PATHOLOGY, AND THERAPEUTICS.

THE USES AND LIMITS OF VACCINE-THERAPY.

THIS subject was discussed at a combined meeting of the Sections of Medicine, Pathology, and Therapeutics. Dr. A. J. CLARK, President of the last-named section, occupied the chair.

Sir ALMROTH WRIGHT, in introducing the discussion, said it was always necessary to decide what was the value of an inoculation, and in dealing with a particular patient, the question arose whether a vaccine would do him any good—i.e., whether a stated dose of the vaccine would have any good effect. It really became a matter of making a complete immunological diagnosis as to the dimensions of the infection rather than of the particular site involved. In a septicæmic case one required to know whether the patient had the power of making an active response to a vaccine. In most cases one had not very exact details as to the amount of response to infection, hence it was necessary to employ indirect inference. The experienced mind with a broad vision recognised that typhoid and anthrax were diseases of the same kind—namely, diseases in which the infecting microbe got into the blood, therefore what would work in one case would probably work in the other also. As living microbes, when injected, acted only after they had been dissolved, it was clear that dead microbes could be used with the same effect as living microbes. The mind which refused to accept laboratory results, or which believed nothing that was not evident to the naked eye, was not of any help in devising new methods. Yet laboratory work showed that when dead microbes were injected into a patient the power of his blood could be increased a thousandfold. Indirect inference was better than direct, because details of cases varied so enormously, not only in regard to the strength of the infection, but also the local condition of the patient and his power of resistance. One could not say that because a hundred cases of phthisis apparently similar acted in a certain way, therefore the hundred and first would so act. In regard to the dose of vaccine, it was necessary to have a general outlook. It was known that a healthy man could stand a very large dose of any vaccine and could respond to it; therefore, if one had a man who had no microbes, he could be expected to respond to a big dose; but if he already had some microbial invasion he had, when an injection was made, to deal with two quantities—those he already had in his body and those injected, and he became sick. For that reason the dose for an infected man had to be smaller than that for a healthy man. The importance of diagnosing the volume of the patient's infection thus became paramount. There was a great need to standardise antistaphylococcic serum; many attempts were being made to do this, but he believed none had yet succeeded. Recently, immuno-transfusion had been carried out—i.e., blood was withdrawn from a donor and introduced into the patient with the idea of supplying the latter with the protective substances he was no longer able to manufacture for himself. This was a valuable method, though it, of course, had its limitations. One valuable fact had emerged—namely, that inoculation of a substance which had a specificity to a particular disease, also produced substances protective for other diseases. That might be regarded as a provision of Nature, for it would be a large order to provide specific substances for each separate disease. He believed it should be possible, in the case of a patient seriously ill with pneumonia, to hasten, by inoculation, the crisis and the recovery, instead of waiting for Nature to bring it about in a more leisurely fashion. To do that it would be

necessary to ascertain what was the patient's critical dose. With regard to tubercle, it had been found, in the last six months, that it was a very easy matter indeed to grow tubercle bacilli in the blood, and in enormous numbers. He thought the future treatment of tubercle would be along cataphylactic lines.

How should one judge of results? Most people would answer, by statistics. But statistics, to be complete, needed to be so many-sided that it was difficult or impossible to carry away any general impression from them. Really, one tested most by experience of cases, history, examination, control, after-care. If a desperate case got well, one was justified in attributing the result to one's treatment.

Preventive Inoculation.

Sir WILLIAM LEISHMAN said he had but little first-hand recent knowledge of vaccine-therapy to offer. He had had a fairly large experience in preventive inoculation, and what one learned in that regard was very useful in the use of vaccines for the purposes of treatment. Not only had preventive inoculation been used against typhoid, but also against influenza, especially in the last big epidemic of it. Probably, however, it was not the bacillus of Pfeiffer which was responsible for this disease, but some ultra-visible virus. A vaccine containing streptococci and pneumococci played a great part in prevention. He reserved his opinion as to the value of sensitised vaccines, lipo-vaccines, sero-vaccines, detoxicated vaccines, &c. The effort was to extract from the germ concerned the immunising agent with as little damage as possible, to free it from its toxic ingredients which caused severe reactions and were of no use in immunising, and to get the essential substance in a condition in which it could be easily manipulated and the dosage standardised. He saw no reason for departing from the method of subcutaneous inoculation; the oral method had not yet been clearly settled. Bacteriologists could not feel very happy about vaccine-therapy largely because of the methods by which material was prepared for investigation and the production of vaccines. Often the material was sent by post to a bacteriologist or to a research institute; there was a short statement as to what the patient was suffering from, and a request was made for a vaccine to be at once prepared. The conditions under which the material was prepared were not known and it might have been a long time in transit, perhaps it suffered extremes of temperature, which killed off the sensitive microbes, and the worker found a vigorous microbe surviving, which he cultured, but which was not, probably, the causal factor of the patient's condition.

Dr. W. GORDON pointed out that, especially in acute cases, the dose of vaccine very frequently given was excessive, and hence was dangerous. He related five cases in which that was strikingly borne out. In his first case death nearly followed the use of an ordinary dose. It was that of a man with streptococcal septicæmia, the organism being grown from his blood. He was given a quarter of a million, and no bad results ensued. Forty-eight hours later half a million were given, and within four hours of the second dose his syncope was so bad that he nearly died. In a second case—streptococcal infection of lung—the same initial dose was given and there was no bad symptom. In view of the other case, a 72-hour interval was observed, and another quarter of a million given, and within four hours he had a similar attack of syncope to the other case. To the remaining cases he gave only 40,000, and the results were quite satisfactory.

Dr. A. P. BEDDARD said that in England the chief prophylactic use of vaccines was in catarrhal conditions of the respiratory tract. His experience was that the more nearly a case was to being a chronic carrier of the infection, the more difficult was it to get any good result from the use of vaccine. He had found a mixed autogenous vaccine superior to a stock vaccine, and it was important to ascertain the bacteriology of the pharynx as well as of the sputum. In a case of a series of outbreaks of streptococcal lobar pneumonia he had been able to abort the attacks by subcutaneously injecting at once a 100,000 dose of autogenous vaccine, followed in 12 hours by a double dose. A difficult class of case was that where infection was in one of the tubes of the body, and, to a less extent, that applied to the respiratory tract; and the difficulty of getting a successful result in those cases was enhanced if obstruction also was present. Many of the failures ascribable to vaccine-therapy he regarded as more or less avoidable. The full bacteriology of the case might not have been ascertained. Or the dosage might be at fault. Too often dosage was determined by rule of thumb based upon apparently similar cases. It was especially difficult in acute cases to get the right dose. Another cause of failure was neglect of local treatment and the presence of mechanical defects. Yet after all these causes had been eliminated there were a number of cases in which the treatment by vaccines as ordinarily carried out was inappropriate in one class and uncertain in the other; and if Sir Almroth Wright's newer method of tackling these cases fulfilled its promise, it would mark yet another advance among those associated with his name.

Vaccination in Chronic Colds.

Dr. GORDON MCKASKIE gave his experience of vaccination for people who suffered from chronic colds. He advocated that the specimen should be incubated as soon as it was obtained; otherwise the more delicate organisms might die out. For that reason it was best to collect the specimen in a bacteriological laboratory. In most of his preventive inoculations he had secured complete immunity, and when patients feeling the symptoms of a cold coming on were injected, the cold was aborted in 24 hours. He had used vaccines extensively also in chronic diseases. In infective arthritis, after removing the obvious source of infection, he had had good results. But in chronic bronchitis his results had not been satisfactory, though in one or two cases in which streptococci were present there was improvement. He had noted no effect in cases of surgical tuberculosis. The opsonic index was now known not to be the valuable criterion in treatment that had been expected.

Sensitised and Raw Vaccines Compared.

Dr. R. ARMSTRONG said that during the last few months he had been making a careful comparison of the properties of the sensitised with those of the raw vaccines, using the pneumococcus for the investigation. He used equal doses of each in rabbits, and estimated the antibody content of the sera. As a result of administration intravenously of sensitised vaccine there was a speedy and complete elaboration of the antibody charge of the vaccine. The stage of diminished immunity persisted for a day, and then slowly immunity developed; at the end of the third day it had only attained 0·6 of the lethal dose for a mouse, but by the sixth day there was a dramatically large increase in the immunity. In the case of the administration of raw vaccine, however, the immunity persisted unchanged for many days. In the case of sensitised vaccines it was far different when giving a course; active immunity was deferred until the seventh day, and its degree was tremendously reduced. He thought this cancellation effect could be explained by successive neutralisations of the doses of sensitised vaccines. This research seemed to show that the profession was, as yet, merely on the threshold of treatment by vaccines. He agreed that the old-fashioned subcutaneous injection of heat-killed vaccines was the most valuable reagent possessed for producing active or passive immunity at present, and more work was needed before embarking on the extensive application of sensitised vaccines, especially in acute infections.

ROYAL MEDICO-CHIRURGICAL SOCIETY OF GLASGOW.

NEPHRITIS.

A MEETING of this Society was held on Dec. 7th and 14th, when a discussion took place on nephritis, with special reference to the physiology and pathology of the kidney. The discussion was opened by Prof. E. P. CATHCART, who gave a brief survey of the modern views with regard to the physiology of the kidney and its function. He referred particularly to the "filtration re-absorption" theory of urinary excretion and also to the part played by the kidney in the regulation of the hydrogen-ion concentration of the body fluids.

Prof. J. SHAW DUNN (Manchester) prefaced his remarks on the morbid changes in the kidney in nephritis by referring to two important conceptions in the study of these changes. The first was the conception of the glomerulus and tubule as a unit of renal structure from the anatomical point of view. Any damage to a glomerulus which produced changes quantitative or qualitative in its filtrate must also affect the function of the tubule; while any disturbance of the vessels of the glomerular tuft must affect the blood-supply of the tubule. The second conception was that of reserve function. The destruction of a large part, or the whole, of one kidney by a gross lesion such as tumour or tuberculosis was rarely followed by any evidence of renal inefficiency; and this was true also in some of the more diffused lesions of nephritis. Thus the clinical picture might give an imperfect indication of the extent of severity of the kidney lesion. The morbid histology of the various forms of nephritis was then described in detail.

Prof. T. K. MONRO gave a brief historical survey of the various conditions included under the term nephritis and referred to the classification into three types, one acute and two chronic. He inclined to the opinion that the secondarily contracted kidney—the chronic form of nephritis following on an acute attack—was perhaps the commonest form met with now in hospital practice. The features, clinical and anatomical, were intermediate between those of the large white kidney and those of the small red kidney. He went on to describe in detail the clinical and pathological features of these various types, referring particularly to the relation of the acute and chronic stages; and drew attention to the acute case which represented an exacerbation of an underlying chronic disease and also to the fact that apparent recovery from an acute attack might result in the return of the patient later with evidence of chronic disease. He then discussed the relation of the arterio-sclerotic kidney—admittedly of vascular origin—to the small red granular contracted kidney and pointed out that, though the latter might yet be found to be of arterial origin, the two conditions were clinically quite distinct.

Dr. ETHEL CRAWFORD described in detail the results of renal efficiency tests which had been carried out in a series of cases in the Royal Hospital for Sick Children, Glasgow. The children were under 13 years of age and were all suffering from inflammatory lesions. Three tests were selected for comparison: (1) The phenolsulphonephthalein test, (2) the urea-concentration test, and (3) the urea content of the blood.

Pigment Test.—In acute cases the excretion averaged 48 per cent.—generally low at onset but increasing as the symptoms subsided. In chronic cases—three months or longer—the average was 57 per cent. In a control series of 26 normal cases the excretion averaged 67 per cent. The test was found to be of no prognostic value.

Urea-Concentration Test.—In acute cases the average was 2·1 per cent., in chronic cases 2·8 per cent. The results of this test were found to be very misleading unless taken in conjunction with the urea content of the blood.

Urea Content of the Blood.—In acute cases the average was 76·6 mg. per 100 c.cm. In chronic cases 37. In normal controls the average was 39. It was high at the onset of the disease and remained high in acute cases, but diminished as a rule as the condition improved. This test was no guide to prognosis nor was it commensurate with the severity of the symptoms.

In general, Dr. Crawford said, these tests do not give any more definite evidence of the severity of the disease, or of the probable outcome. They do not give any help in distinguishing between acute, subacute, and chronic cases, and during the disease they merely corroborate the clinical symptoms.

In the discussion which followed, Prof. R. MUIR expressed the opinion that the time was not far off when we should be able to establish a definite relationship between the functional disturbances and the structural changes in the kidney in the various types of nephritis. He referred to the progress already made in the differentiation of the azotæmic and hydræmic types, and was especially interested in Prof. Dunn's remarks regarding the association of the hydræmic type with subacute nephritis. He found it difficult to harmonise the modern physiology—e.g., the filtration re-absorption theory—with the pathological facts met with in the disease.

The following also took part in the discussion: Dr. J. NORMAN CRUICKSHANK, Dr. J. R. C. GREENLEES, Dr. G. M. WISHART, Mr. INGLIS POLLOCK, Mr. W. W. GALBRAITH, Dr. J. FERGUSON SMITH, Dr. H. E. JONES, and Dr. W. SYME.

WEST KENT MEDICO-CHIRURGICAL SOCIETY.—A meeting will be held at the Miller General Hospital, Greenwich, to-day, Friday, Jan. 11th, at 8.45 P.M. Mr. Willmott Evans, Dr. M. Davidson, Mr. C. A. Joll, Dr. Harold Pritchard, Mr. P. B. Roth, and others will show clinical cases.

SOCIETY OF MEDICAL OFFICERS OF HEALTH: *Maternity and Child Welfare Group.*—A meeting of this Group will be held at the house of the Society, 1, Upper Montague-street, Russell-square, London, at 8 P.M., on Jan. 17th. Dr. William Cramer will read a paper on Vitamins and the Borderland between Health and Disease, illustrated by slides. The lecture is open to all those interested in Maternity and Child Welfare work, and members of the Dental and School Medical Groups are invited to attend.

MEDICAL SOCIETY OF LONDON.—The syllabus of the second half of the session 1923–24 has now been issued. The Lettsomian Lectures on the Treatment of Pulmonary Tuberculosis will be delivered at 9 P.M. on Feb. 18th, March 5th and 17th, by Dr. R. A. Young, and the annual oration will be delivered at 9 P.M., on May 5th, by Mr. Wilfred Trotter, on Certain Minor Injuries of the Brain. On Jan. 14th, at 8 P.M., a pathological meeting will be held. Dr. H. G. Butterfield will give a demonstration of his method and apparatus for micro-photography. On the 28th, at 8.30 P.M., Dr. G. Arbour Stephens will give a short historical note on Transfusion of Blood and Injection of Medicated Liquors as carried out in 1650–1700, and Dr. John Poynton, Mr. Twistington Higgins, and Dr. J. M. Brydone will communicate a paper on the Present Position of the Treatment of Pyloric Stenosis in Infancy. On Feb. 11th, at 8.30 P.M., a discussion on the General Symptoms and Remote Manifestations of Common Affections of the Nasopharynx, Accessory Sinuses, and Throat, will be introduced by Mr. Herbert Tilley, followed by Lord Dawson, Dr. John Poynton, Mr. W. M. Mollison, Dr. E. M. Callender, Sir Thomas Horder, Mr. C. W. M. Hope, Mr. E. D. D. Davis, and others. On Feb. 25th, at 8.30 P.M., a discussion on the Treatment of Fibroids of the Uterus will be introduced by Dr. Cuthbert Lockyer, followed by Sir George Blacker, Mr. T. G. Stevens, Dr. H. Williamson, Mr. Beckwith Whitehouse, Dr. N. S. Finzi, Mr. J. P. Hedley, Dr. Douglas Webster, and others. On March 10th, at 8.30 P.M., a discussion on the Disturbances of the Nervous System in Hyperpiesia will be introduced by Dr. Batty Shaw, followed by Sir Humphry Rolleston, Prof. Ernest Starling, Prof. W. Russell, Dr. James Collier, Dr. F. M. R. Walshe, Dr. Geoffrey Evans, and others.

Reviews and Notices of Books.

MASTER JOHANN DIETZ.

Translated by BERNARD MIALL. First published by Dr. Ernst Consentius. London: George Allen and Unwin, Ltd. 1923. Pp. 315. 12*s.* 6*d.*

Johann Dietz was a barber surgeon in the seventeenth century, who left behind him an autobiography in which he recorded his life from beginning to end, and this document, or its contemporary copy, is preserved in manuscript in the Royal Library of Berlin. The first version of the biography appeared some nine years ago under the editorship of Dr. Ernst Consentius, to whom permission was given not only for the printing of the manuscript, but for reproduction of any of the engravings necessary to supply the record with authentic pictures; this volume is a translation by Mr. Bernard Miall. It is a most interesting as well as profusely illustrated record of an adventurous career. From internal evidence presumably, Dr. Consentius states that the autobiography was not commenced until Master Dietz had reached his seventieth year, and the probability, therefore, is that the dating is not very strict, one episode reminding the writer of another, and that in turn requiring a sequel. Perhaps there is no maintenance of strict chronology, that may well be, but none the less we gather a remarkable picture of stirring times from one who lived, rejoiced, and suffered in them.

A member of the Guild of Barbers, Master Johann Dietz learned surgery in one of the normal methods of the times by serving on military campaigns—he went as doctor in the army of "the Great Elector" Friedrich Wilhelm, of Brandenburg. This distinguished prince, in support of the Hapsburgs and the Holy Roman Empire, or to annoy the King of France, took part in 1663 in a campaign against the Turks, and we have a fine description of the siege of Ofen, of military and medico-military proceedings throughout fierce warring, and of a weary journey back to Berlin. And in spite of the sensational nature of the episodes the story rings true, while it says much for the hero's thirst for adventure that almost immediately after arriving home we find him, in the most light-hearted way, accepting an offer made to him in a guest-house at Hamburg to voyage to the Arctic Ocean. Johann Dietz accepted an offer of 12 thalers monthly, to accompany three recent acquaintances for an unlimited time, and drew one month's pay in advance in order to buy a new medicine chest. And so he went a-whaling, in the course of which calling he describes Spitzbergen and Greenland, makes some amusing biological reflections, and details some dangerous voyaging back along the Norwegian coast with its fogs and hidden rocks.

The last part of the book is largely made up of the astonishing inconveniences and even unhappinesses of his career as a husband. He makes no secret of his view that he was caught, as to one of his alliances, by craft, a widow with three children securing him "after many fine opportunities and alternatives." He allows that he did his best to get out of the contract, which, however, was carried through although the bride's settlement seems actually never to have been paid.

But perhaps it was fair that Master Johann Dietz should pay in the unhappiness of married life for certain amatory episodes which he details with frankness in an amusing and informing narrative, every page of which reads like an imaginary journal by Defoe or Thomas Nash. The probable popularity of his adventures for public reading was, as a matter of fact, detected by one Christian Reuter, for it appears from one of the appendices to Mr. Miall's translation that the biography served as the text for that author's well-known German romance. This made its appearance in 1696, the author being almost contemporary with Johann Dietz.

HANDBOOK OF THE NEUROLOGY OF THE EAR.

Produced by Prof. Dr. G. ALEXANDER and Prof. Dr. O. MARBURG. Edited by Dr. H. BRUNNER, of Vienna, with the collaboration of eminent specialists. Vol. I., Part 1. Berlin and Vienna: Urban and Schwarzenberg. 1923. Pp. 699. Fr.48.75.

IN recent years our knowledge of the reflexes and other nervous reactions originating in the ear, and especially in the labyrinth, has been rapidly increased by careful clinical investigations and by a long series of experiments on animals. The neurologist and the otologist have also been brought closely together in the study of the endocranial complications of ear disease and in the examination of the aural symptoms of certain cerebral tumours. The results of these observations are scattered through otological and neurological publications, and it is appropriate that a work should be published which deals with this borderland between neurology and otology as a whole. How extensive this borderland is may be judged from the fact that this large book is but the first half of the first volume designed to cover the subject. The first volume is to deal with the theoretical, the second volume with the clinical aspects of the subject. This volume is well printed and profusely and beautifully illustrated; it is without index or table of contents, and consists of a series of independent articles, each with its own contents-table and bibliography. They are very thorough and complete, and are written by well-known authorities in their respective subjects. Prof. Alexander describes the macroscopical anatomy of the nervous structures of the ear, Prof. Kolmer the microscopical, while Prof. Marburg deals with the development and anatomy of the nerves and central nerve-paths. Physiology is dealt with in a series of articles, including one on the outer and middle ear and one on the inner ear, and articles on localisation of sound, on perception of tone, and a full account by Prof. Magnus and Dr. de Kleijn of their experimental work on the otolith reflexes. Dr. Rudolf Leidler contributes a good discussion on vertigo, and Dr. J. Dusser de Barenne an interesting description of the physiology and neuropathology of the cerebellum.

All the contributions are of a high standard and when completed, the work will be of great value to neurologists and otologists alike.

SCIENTIFIC METHOD: AN INQUIRY INTO THE CHARACTER AND VALIDITY OF NATURAL LAWS.

By A. D. RITCHIE. London: Kegan Paul. 1923. Pp. 202. 10*s.* 6*d.*

Mr. Ritchie exhibits in this book an elaborate geniality, the affability of the schoolmaster who is a boy among boys, and is not too proud to use slang; but he has written a work that contains much information worth the ordinary reader's while to possess. He points out that inasmuch as no single mind can contain the whole of the results of modern scientific investigation, any man's opinion on most topics is bound to be superficial and based on hearsay. He therefore disclaims any attempt to survey the present state of scientific theories or to test their validity, but essays to state what kind of reasons there can be for holding any scientific theories, whether those of Pythagoras, Newton, or Einstein.

An introductory chapter dealing with the origins of science, its relation to metaphysics and to logic, a definition and a classification, leads to a discussion in Chapter II. of the ultimate data of knowledge and the classification of the data of experience. Chapter III. deals with natural laws, and Chapter IV. with the validity of laws, Chapter V. with measurement, and Chapter VI. with theories, while the concluding chapter is devoted to the limitations of scientific method and a consideration of science in relation to metaphysics. Mr. Ritchie's personal knowledge of experimental research gives point and interest to his illustrations. He is not, however, always scrupulously fair in setting out opinions with which

he disagrees. This appears in his discussion (on p. 132) of the justification of an average. The argument that an average of certain measurements is more likely to characterise the "true" value of the quantity sought to be measured is not, we think, disposed of by the remark: "The observer who imagines there is some real or true value, which can be attained by correctly calculating an average from a collection of different numerical results, is guilty of the absurdity of thinking that arithmetical calculations can supply better information about the external world than actual observation." He is guilty of no such absurdity; all he is guilty of is (*a*) a belief that several equally imperfect measurements are more likely to give a correct appreciation of the "truth" than one such measurement; (*b*) a theory that the value that gives a maximum probability to the concurrence of the measurements is the best approximation to the "truth" he can make. Neither proposition is absurd, the absurdity is really Mr. Ritchie's—viz., the tacit implication that "the observer" thinks that the quality of the observations to be averaged is indifferent. We do not believe that the most rabid exponent of the calculus of errors ever maintained any such proposition.

In discussing the genesis of discoveries, Mr. Ritchie is on firm ground. "The vital, if not the only, difference between the successful and unsuccessful investigator lies in the capacity to frame the appropriate generalisations that are presupposed in any research. Probably it is more a matter of instinct than of argument. The generalisation that is needed may be one that only has a very minute degree of probability a priori so far as any logical analysis can show. One may try to avoid the difficulty by saying that it is found by analogy, but that does not really mean anything. Analogy comes in undoubtedly, but in this process analogy is a very slippery guide. There will be a thousand false analogies for one correct one, and no obvious means of choosing them." A great investigator is as individual a genius as a great poet, but, in these days, when dull, rich men really think they can buy scientific discoveries, the point cannot be made too often.

MUSIC, HEALTH, AND CHARACTER.
By AGNES SAVILL, M.D. London: John Lane. 1923. Pp. 234 and index. 7*s.* 6*d.*

AN autobiography of Dr. Savill's musical conversion, to which is appended a discussion of the effects of music on the human organism, forms a most interesting book, one which might be called "From Darkness to Light," or "A Pilgrim's Progress." In the latter part of the book the interest lies in the view of music as a healing agent, taken by a woman physician who has slowly and after various trials been brought to religious faith after a period first of active dislike and later of scepticism. The ground here covered is not, therefore, new, save in its relation to the development of a musical sense. But the first part of the book should be widely read. Those who have and always have had the gift of properly appreciating music will take delight in the upward progress of the musical organism, from embryo to nearly full growth, and those who, to their regret, have no, or almost no, musical faculty, will be heartened in their quest by Dr. Savill's frank revelations of her progress. She tells us how when she was young, and for many years after, music not only bored her but awakened active dislike, not only of the music but also of the performer. In fact, she had much in common with the elder Mr. Osborn, who remarked, "I saw one of 'em speak to a damn fiddler, a feller I despise." Her first awakening came from seeing Maud Allan dance, though the pleasure here was not so much the sound of the music as the rhythmical illustration of it. Then she tried a mechanical piano, but, as was only natural at this stage, found but little pleasure in it, except that it could recall Miss Allan's movements. At last, in March, 1913, she heard Busoni play some Chopin and the light broke in upon her soul. Next she heard Pachmann, of whose playing she gives an admirable description, and before the summer of 1914 she had heard most of the leading pianists of the day, and she adds, "I recall with most delight the fine sensitive beauty of the interpretations given by Mr. Leonard Borwick." She does not tell us what this great artist played, but we hope it was Bach; if so, her musical education was advancing rapidly.

We do not follow Dr. Savill all through her pilgrimage—suffice it to say, that her awakening to orchestral music was brought about by hearing Parsifal. Thence she passed to Beethoven and Bach, to Tschaikovsky, and to some of the moderns, Vaughan Williams, Holst, and Delius. And her opinions and comments upon various composers and their works are of real interest. We do not—no one will—agree with all of them, but her progress so far has been so rapid that we see every reason for supposing that she will attain to the full standard of appreciation. For instance, Tschaikovsky's (6th) Pathetic Symphony has been dethroned from the high seat which it first occupied in her mind, and we venture to suggest that she should hear Nos. 4 and 5, both superior to No. 6. She knows but little of Bach, but realises that his is great music (pp. 100 et seq.) and yet she has apparently heard none of his organ music. To anyone who is able to say, as the author does on p. 208, "Great music arouses a condition of reverence, wonder, and joy, a state of mind similar to that which is produced by prayer, and hence it may be used to bring about the accomplishment of the same high and useful ends," there is a foretaste of the happiness to be gained in the hearing of the Chorale preludes, toccatas, and fugues. The great Toccata in F, with its solemn fugue, is a real musical translation of the twenty-ninth Psalm, and perhaps the most wonderful piece of abstract music ever written is the Dorian Fugue. There is another school of music to which we direct her attention—namely, the polyphonic school of Palestrina, his followers, and the Elizabethan madrigalists. If Dr. Savill learns to understand the Missa Papæ Marcelli (she can hear it at Westminster Cathedral), she will get over her musically youthful admiration of Parsifal.

Dr. Savill confesses that she finds difficulty in distinguishing the various sounds of the orchestra, especially of the wood wind, a difficulty which many others feel. This difficulty is a real bar to the right understanding of music and prevents the hearer from getting much of the good out of music. As a simple and singularly beautiful beginning we advise Dr. Savill to go to hear the B minor Symphony of Schubert, and to take with her a miniature score. In the slow movement is a conversation between flute, oboe, and clarinet, which will aid her to distinguish the respective quality of these instruments, for the score will tell her which is playing. We are in absolute agreement with Dr. Savill's main contention in the second part of her book, which, put shortly, is that good music brings us in touch with the Infinite. Hearing good music, given competent executants, is like talking to great men, for the music is the product of great minds. Of course, even the great composers had their weak moments. Handel wrote a good deal of rubbish, as well as such things as the slow movement at the end of "All we like Sheep," or the Amen Chorus which finishes the "Messiah," or the Allegro movement of the Organ Concerto in G minor in the first set of six, to take only a few of his masterpieces. Even Bach nodded sometimes, but, on the whole, anyone who can hear Bach, Handel, Schubert, Beethoven, Chopin, Palestrina, the Tudor musicians, and Purcell will feel that he is carrying out the apostolic precept, "Whatsoever things are true, whatsoever things are honest, whatsoever things are just, whatsoever things are pure, whatsoever things are lovely, whatsoever things are of good report; if there be any virtue, and if there be any praise, think on these things." That is the frame of mind which helps to maintain a sound body and therein lies the benefit of music in medicine.

Dr. Savill's book is a lighthouse which will, if they look at it, be a guide to many a one who is stretching out his hands in the darkness.

HEALTH AND CONDUCT.

By A. J. BROCK, M.D. Edin., with an Introduction by Prof. PATRICK GEDDES. London: Williams and Norgate. 1923. Pp. 296. 10s. 6d.

ON p. 285 Dr. Brock asks, "Is the main thesis of this book understood?" and the reviewer has to answer with modesty, "It is not." In such cases light is sometimes to be had from "forewords," but Prof. Geddes's introduction is as obscure as the rest. However, it is clear that Dr. Brock is not satisfied with our world as it is, is persuaded that it needs "sociological re-synthesis and re-orchestration," and that the process of cure is connected in some way with the methods of regional surveys. In medicine he feels that the orchestrator is the general practitioner, to whom specialists should be subordinated, and remarks that there is much less need of further detailed research than there is of our digesting the superabundant information that we already possess—an opinion which will find many supporters. But it is hard to trust an argument which includes the proposition (p. 30) that "the synthetic preparations of the State-supported German drug industry flooded our markets, and were obviously (for the ends of their manufacturers) within sight of controlling our philosophy of life." Perhaps Dr. Brock does not want to say more than that the most important thing in life is one's commonplace daily duty to one's neighbour—which may include giving him a dose of aspirin to help him over a headache; but if that is the message, its form has been insufficiently condensed. Many good qualities have gone to the making of the book, and the author's experience is considerable, but none the less seems to hit no particular mark.

LECTURE NOTES IN MEDICAL PROTOZOOLOGY.

By R. KNOWLES, Major, I.M.S., Protozoologist, Calcutta School of Tropical Medicine. Calcutta: D. N. Banerjee, Banerjee Press. 1923. Pp. 236. 7s.

IN these lecture notes, which are arranged as 20 lectures and occupy 236 pages, the author has given a condensed account of those protozoa which parasitise man and the methods by which they are studied. They are not a substitute for lectures, text-books, or practical laboratory instruction, but are intended to serve as a guide to the subject while the student is actually at work. The information is remarkably accurate and practically every important point has been noted. By the use of large type essential facts are emphasised, and warnings against common mistakes are brought to the student's notice. Certain books and papers which may be consulted with advantage are recommended. The student who uses this book as it is intended to be used will find it of the utmost assistance to him, and it will undoubtedly help to simplify a subject which often appears peculiarly confused and difficult to understand.

RUBBER AND GUTTA-PERCHA INJECTIONS.

By CHARLES CONRAD MILLER, M.D. Chicago: Oak Printing and Publishing Co. 1923. $1.75.

THE filling of all cavities in the human body is a difficult problem, and no material has yet been discovered which meets the requirements of every case. Dr. Miller suggests the use of gutta-percha and of rubber in finely divided form, and discusses in some detail the experiments he has tried in the production and manipulation of a suitable filling material. His work is extremely suggestive, but it is a pity that he has given no precise records of either the animal or clinical experiments which he has tried. His methods have scarcely emerged from the laboratory stage, and he concludes by the cautious statement that "for the present patients should be told that these methods are not as yet recognised as established surgical procedures."

The book may be recommended to those who wish to investigate the difficult and important question of filling defects, whether for curative or cosmetic purposes.

The Conduct of Medical Practice.

A Series of Articles by Experts dealing with the Difficulties Encountered in Professional Life and How to Meet Them.

II.—ASSESSMENT FOR INCOME-TAX: DEDUCTIONS, ALLOWANCES, AND RELIEFS.

BY W. R. FAIRBROTHER, F.S.S.,
ACCOUNTANT AND INCOME-TAX SPECIALIST.

For this relief much thanks.—*Hamlet*, Act I., Sc. 1.

THE form of account-keeping having been explained in the first article,[1] it is now proposed to deal with the subjects of Income-tax assessment and the deductions, &c., which may be claimed for the purposes of tax.

Computation of Income-tax Assessment.

For the purposes of Income-tax assessment it is permissible to include salaries from public appointments in the assessment on the practice generally. This point was provided for in the preparation of the final account and proves of advantage inasmuch as one demand only is received instead of a number varying with the number of sources of professional income. It is presumed that the final account shows no private payments excepting in so far as it is impracticable to separate them from the business payments. These joint payments would consist of such items as rent, rates, repairs, insurance, lighting, and heating where the practice was conducted from the residence, which is, of course, the general mode of practice. In these circumstances the computation of the profit liable to assessment would be in the following form:—

Balance per account						£1,233	0	0
Add back to profits—								
Half rent (or Sch. "A")			£25	0	0			
Half repairs			5	10	0			
Half lighting and heating			10	0	0			
Half rates, &c.			17	10	0			
Half insurance			1	0	0			
						59	0	0
Adjusted profit for 1922–23						£1,292	0	0

If the practice has begun within the year of assessment (i.e., April 5th), the necessary proportion of the first year's profit will form the first year's assessment; the second year will be a 12 months' proportion of the first year; and the third year will be based on the average of the two preceding years. The fourth and subsequent years' assessments are arrived at on the well-known basis of the three years' average and the calculation of the assessment for 1923–24 would be as follows:—

1922–23—Profit as above	£1,292
1921–22—Adjusted profit previously agreed (say)	1,000
1920–21— " " " "	1,000
	3) 3,292
Average for 1923–24	£1,097

It should be mentioned that the proportion of private expenses added back to profit is not uniformly one-half, some districts regarding the proportion liable to be added back as two-thirds. The practice in and about the City of London appears to be to add back one-half, with the result that the other half of such expenses have in effect been allowed as a business charge. Why this practice is not adopted generally (particularly in the provinces) where practitioners conduct their practice from the residence is not easily understood, but it appears to be a point worthy of the attention of medical practitioners' associations. It is, of course, understood that where the premises are used for the practice only, and not for any private or domestic purpose, the whole of the expenses are chargeable.

With regard to the use of a motor-car in the practice a curious anomaly exists. The right to claim car wear

[1] THE LANCET, Jan. 5th, p. 30.

and tear is confined to traders and manufacturers, so that whilst a business man is allowed a deduction for depreciation of the car employed in his business a doctor, whose practice equally necessitates the use of a car, cannot claim the same deduction. The Royal Commission recommended that the allowance should not be restricted to traders, and in this case also there would seem to be scope for pressure by the professional associations to induce the Government to amend the law on the subject. A renewal of a car may, of course, be claimed, but only to the extent of the value replaced less the amount received on sale or exchange.

Deductions, Allowances, and Reliefs.

The amount of the assessment in respect of the business having been arrived at, it becomes necessary to make a complete return on the well-known buff form. The amount liable to assessment should be inserted on page 2, together with any other amounts arising under the other heads shown on that page. On page 3 of the form a complete return of all sources of income and of charges thereon should be furnished to enable the deductions and allowances to be claimed. Page 4 should also be carefully completed so that any allowances may be given against the assessment to be made. The notice of assessment issued later will follow the return made, provided, of course, the latter is correctly completed. On receipt of such notice the assessment amount should be carefully verified together with the appropriate deductions and allowances including earned income relief one-tenth, personal allowance of £135 single, £225 married, and wife to £45 if earning income, child allowance of £36 and each additional £27, housekeeper £45, widowed mother £45, dependent relative £25, first £225 of taxable income at 2*s.* 3*d.*, and life assurance premiums from 2*s.* 3*d.* to 4*s.* 6*d.* per £. The period within which to appeal against the assessment is 21 days, and any necessary notice should be given before that period expires.

There are certain circumstances in which adjustments may be made in the tax payable within or after the end of the year of assessment. The following constitute the principal grounds, and any adjustment can be made to take effect by way of repayment or of reduction in the outstanding tax :—

1. Where a change in ownership has occurred within the year, the current year's assessment is apportioned between the person ceasing and his successor.

2. Where owing to the person ceasing to carry on the profession or dying or becoming bankrupt or from any other specific cause (where ownership has changed) the profit falls short of the assessed amount, a reduction may be claimed to the actual profit of the year.

3. A person succeeding to the practice or a new partnership may apply for adjustment to the actual profit in the year of assessment if such profit is less through some specific cause arising since or by reason of the succession or partnership change. "Specific cause" as referred to here relates to such occurrences as removal to other premises, or loss of personal influence.

4. If the profession has commenced within the last four years a claim may be made for reduction to the actual profit of each year. It is not necessary, therefore, in this period to abide by the average figure and the option of claim is entirely with the taxpayer.

5. If the profession is discontinued, a claim may be made to have the assessment of the current year reduced to the actual profit and a further claim to have the total profit of the three previous years substituted for the total assessments of those years may be entered.

6. Where a loss is sustained in the profession, tax on the amount of such loss is recoverable against any tax paid for that year. This relief is usually claimed only in the absence of any other equivalent relief and then with discrimination, as the loss on which repayment is made is not allowed in reduction of future averages. It is, however, distinctly advantageous to claim when the rate of tax is falling as it can readily be seen that a repayment in, for example, a 5*s.* year, will result in a saving of 6*d.* per £ if the loss is set against a 4*s.* 6*d.* year.

7. In the event of it being found that an error or mistake in the return or statement has been made, repayment may be claimed for three years back on account thereof.

The foregoing points constitute salient features in the taxation of professions, but it will be appreciated that the many phases of assessment and allowances are subject to varying conditions and stipulations impossible of compression into a short article. The many Acts and various text-books on the subject of Income-tax readily demonstrate the complexity of modern taxation, and probably no field in the fabric of social life is so encumbered with legislative enactments and judicial decisions, not to mention the numerous modifications introduced in practice. The ramifications of taxation are so wide and so deep that even in an extensive practice it is an almost unique occurrence to deal with two cases containing precisely similar circumstances and conditions. It is true that members of any one profession may derive help in conforming generally to an approximately standard type of business assessment—as shown above—but it is equally true that in the computation of other income, in the statement of charges, and in the claiming of adjustments and allowances they must join the general community of confused and exasperated persons known as "taxpayers."

THE DISCOVERY OF RADIUM.

CELEBRATION IN PARIS OF THE TWENTY-FIFTH ANNIVERSARY.

IT is now just over 25 years ago that (on Dec. 26th, 1898) the discovery of radium was made known to the scientific world in a communication addressed to the Académie des Sciences de Paris. On Jan. 2nd two ceremonies took place, one at the Fondation Curie, the other at the Sorbonne, in celebration of this anniversary. The first of these was the inauguration, in the presence of Mr. Paul Strauss, Minister of Hygiene, of the Dispensary of the Fondation Curie; at this ceremony many leading scientific and medical men took part. Mr. P. Appell, Rector of the University of Paris and president of the Council of Administration of the Fondation, opened the proceedings; orations were then delivered by Mr. Régaud, professor at the Institut Pasteur and secretary-general of the Fondation, by Mr. Bergonié, and by Mr. Strauss, who expressed to all those associated with the Fondation, and particularly to Madame Curie, the recognition by the Government and the public of the great results obtained in the incessant work carried on by the institution.

At the second ceremony, in the great amphitheatre of the Sorbonne, the chair was taken by Mr. Alexandre Millerand, President of the French Republic, who had on his right Mme. Curie. Mr. Appell, speaking in the name of the Fondation Curie, described the achievements of science made possible by the great discovery associated with the names of Mr. and Mme. Curie, thanked the President and the representatives of Great Britain, the United States, Belgium, Spain, and other countries for their presence and support, and paid a tribute to Mr. Strauss for his organisation of regional centres for the campaign against cancer. He concluded his address by expressing the gratitude of the Fondation to Mme. Curie for her gift of a gramme of radium, to Mr. Henri de Rothschild for his recent donation of 500 milligrammes of the element, and to other benefactors of the institution.

Mr. Jean Perrin gave a brief survey of the importance of radio-activity, and Mr. Baclère dealt with the relations of radium and medicine. Mr. Léon Bérard, Minister of Public Instruction and Fine Arts, recalled the circumstances in which was passed the Act recording the discovery of radium, and expressing the gratitude and admiration of the Republic upon that occasion. Mme. Curie briefly replied, and the President associated her name with that of her husband in a final tribute of praise.

THE LANCET.

LONDON: SATURDAY, JANUARY 12, 1924.

ORGANISED MEDICAL RESEARCH.

THE report of the Medical Research Council for the year 1922–23, which is published to-day,[1] records the retirement from the Council of Sir WILLIAM LEISHMAN and Prof. F. GOWLAND HOPKINS, the two last remaining members of those originally selected in 1913. They have thus served the Council over a period of ten years, and this report is to some extent the record of a decade of organised medical research, for a number of the objects of present study were among the earliest schemes of work. Tuberculosis was one of these early objects, as was natural when the research fund was obtained from National Insurance resources by a levy of one penny per insured person.

The Council is no longer directly related to the Ministry of Health, but tuberculosis work continues to be directed by a group of subcommittees to which, by permission of the Ministry, Dr. A. S. MACNALTY acts as secretary. One subcommittee deals with bacteriological questions, another with the uses of tuberculin, while statistical studies are supervised by a Statistics Committee which includes other aspects of industrial health. A special subcommittee is in charge of the trials now being made with Prof. G. DREYER's diaplyte vaccine. Heliotherapy comes within the scope of the Committee on the Biological Actions of Light. The personnel of all these committees is set out in the document, and we call attention to them as one example out of many of how the work of the Council has broadened and ramified during ten crowded years. The subject of accessory food factors, one of a group which sprang into importance in the critical years of war, continues to occupy the close attention of a committee appointed jointly by the Council and the Lister Institute. The work of Dr. HARRIETTE CHICK and her colleagues has modified the continental conception of rickets as an infectious disease and popularised the idea of vitamin deficiency which, nebulous though it still is, may prove a boon not only to the starving Viennese children who were the first to benefit. This war-time work has carried on into the post-war period which has provided many new activities of its own. Most dramatic of these was the overdue discovery of the function of the pancreatic islands by the Toronto school, since enriched by the work of Dr. H. W. DUDLEY and Dr. J. H. BURN at the Central Research Institute—work which is justifying Dr. H. H. DALE's prophecy that insulin will prove to have an importance for physiology and medical science far beyond that of its use in the treatment of diabetes. These three examples, taken from different periods, will give an idea—it is impossible to do more—of the volume of organised research which increases from year to year.

A contribution of £130,000 is the sum-total allotted to medical research by a country of business men, and it is almost incredible how this sum has gone so far. It includes the expenses of the Industrial Fatigue Research Board, for which the Council became sponsor rather than allow its work to drop. The National Institute, the central forcing-house, absorbs about one-third of the remainder, and yet nearly 600 entries appear in the index of personal names of associate workers. Many of these are nursing seedlings which are still in cold frames, but there is more than a chance that some of them will prove hardy enough to survive, although no one can say which. One can only hope that the scientific zeal of the individual is not being unfairly exploited by the community, a suspicion raised rather than allayed by the Lord President of the Council when he stated recently that many men of science would work for Government at less remuneration than similar private work would receive. A closer study of the Research Council's finance is reassuring, for the Council is becoming increasingly a clearing-house for research funds. The Dental Board has allotted a large sum for inquiry into the causes of dental disorder, the Miners' Welfare Fund another for studies of miners' dietaries, the Carnegie Trust a third for investigation of environment on the growth of children. These and other grants from various sources, including relatives of grateful patients, are placed at the disposal of the Council. Moreover, the Rockefeller Foundation has made it possible to give a group of British workers the opportunity of scientific study in the United States besides sending American students here. The proper outlook of research is dealt with in a few striking paragraphs of the report. It is something other than that of the "man of science," so humorously ridiculed by Sir RONALD ROSS, as the sort of person who pulls out his watch and exclaims: "Ha! half an hour to spare before dinner: I will just step down to my laboratory and make a discovery." The bearing of much research work upon medicine and hygiene necessarily seems remote, but the history of insulin—even the name of which was suggested many years ago by Sir E. SHARPEY SCHAFER—is a complete justification of the wide view. And it is the wide view that must be popularised, for many can appreciate results who cannot follow the intensive studies which have led up to them.

[1] Committee of the Privy Council for Medical Research. H.M. Stationery Office. 3*s*. 6*d*.

FOOT-AND-MOUTH DISEASE.

HUMAN medicine is not greatly interested directly in the epizoötic stomatitis of animals, for it is a fact, as the Minister of Health recently stated, that foot-and-mouth disease is rarely communicated from animals to man, and, when so communicated, the illness has been mild; in this country there is no record of death having resulted in a healthy person. Moreover, the use of milk from infected animals is prohibited by law, and the enforcement of this regulation is not very difficult. But the epidemic of this cattle plague which is at present visiting the country presents problems very interesting indeed to the medical man; for here is an epidemic against which the most effective methods can be used, whatever they may be. Endemic small-pox or plague cannot be stamped out by simply destroying the centres of infection, but the Ministry of Agriculture has public opinion solidly behind it in attempting so to stamp out foot-and-mouth disease if the procedure can be justified economically. Up to the end of last week more than two millions of money had been laid out in compensation for destroyed animals, something over a quarter of a million being returned in the salvage of healthy carcasses. The total number of animals then condemned amounted roughly to 68,000 cattle, 25,000 sheep, 33,000 pigs, and a few goats. At the same time, hunting has practically stopped, and hunting is an industry as well as a sport, providing a weekly sum of £75,000 in wages and £175,000 a week in forage. Further, the risk of infection has led Australia to prohibit the

importation of cattle, sheep, swine, and goats from Great Britain or Ireland, the Union of South Africa has done the same, while the Free State of Ireland, after forbidding the import of animals and poultry from infected areas in Great Britain, issued a still stiffer order on the first day of 1924. Whichever way the nation turns there is fearful loss to contemplate, unless the policy of slaughter is rapidly successful.

On the epidemiological side the problem touches human medicine very closely, for is not the infection of epizoötic stomatitis of the same order as that of influenza or measles? It was proved during the last years of last century—by LÖFFLER and FROSCH, by HECKER, and by NOCARD and ROUX—that the virus will pass through fine filters. The virus is present in the blood-stream of affected animals in the early stages of the disease, and is found abundantly in the lymph of the characteristic vesicles and in the saliva. From these situations, however, it soon disappears. Recovery from the disease is the rule, but the immunity which is left is generally short-lived. In the average case, an animal which has passed through an attack is refractory to a second infection for about a year, but cases are not infrequent where a second infection follows within a period of a few weeks. The attempts which have been made to confer immunity have been partially successful. The possibility of passive immunisation of cattle with highly potent serum has been shown by NOCARD, ROUX, CARRÉE, and VALLÉE. An immune serum is obtained from cattle which have passed through an attack of the disease, or from cattle which have been hyper-immunised. Active immunisation is attained by injecting an animal first with immune blood and then with virus which is obtained from infective lymph or blood. The volume of blood required to confer passive immunity depends, of course, upon the potency of the blood injected. This, as a rule, is low, and the quantity required may be as much as 500 c.cm.—a fact which prohibits the application of the method in the field. Moreover, since it has been found by VALLÉE and CARRÉE that there exist more than one strain of virus, it is clear that a polyvalent serum would be required. Attempts to cultivate the virus have been made by many bacteriologists in France and in Germany, but so far without success. The isolation and easy cultivation of the virus is, however, clearly the first and most pressing need. Given a regular supply of virus, the immunity work would be simplified, and the possibility of prophylactic vaccination would be before us. Further, an accurate and precise knowledge of the virus would be of immense value to those who are engaged in attempting to discover the mode of spread of the disease—work of the first importance for this country. But here lies a grave difficulty which has apparently escaped the attention of the daily press in its almost petulant demand that something shall be done. It is simply impossible in the present circumstances for an individual bacteriologist or for any institute of research to undertake such work. The necessarily stringent regulations which aim at eliminating foot-and-mouth disease prevent this, and for the obvious reason that the authorities fear the possibility of the disease spreading from laboratories engaged in the research. Moreover, the expense of such work would be too heavy for the slender resources of any laboratory in this country. An attempt to cultivate the virus of foot-and-mouth disease would need official permission in the first place, and in the second place considerable public financial assistance. These granted, is the problem a fit one for investigation, and if so, what could reasonably be done?

The first of these questions deserves notice. The unprinted, though freely spoken, objections to the initiation of research are: First, that the problem of foot-and-mouth disease has been studied abroad during the last 20 years and without conspicuous success, and is therefore, if not insoluble, too difficult for profitable inquiry; and, secondly, that it is impossible to study the disease in this country because of the risk of spreading infection. The first objection may be dismissed: if this spirit prevailed in medicine there would be no research on cancer or, indeed, on any of the outstanding pathological problems. Medical knowledge would stagnate, and the profession would merit the contempt of enlightened men. The second objection has, if newspaper reports are correct, been answered by the veterinary experts of the Board of Agriculture. Pedigree herds of cattle which have been affected have been spared because the conditions under which the animals are kept, and the strict isolation of the farms on which the disease has occurred, are such that infection cannot spread. It can hardly be beyond the wit of man to plan an experimental farm at least as well situated and controlled as these.

In order to answer the second question—namely, what are the prospects of success in the search for the virus—we must be guided by what is already known of the class of organisms which are called "filter-passers." The human diseases which are known to be caused by filter-passing viruses have been extensively studied, particularly by the Rockefeller Institute in New York. The virus of infantile paralysis has been grown, and within the last three years OLITSKY and GATES have described a small organism, the *B. pneumosintes*, which they believe to be the cause of influenza. The difficulty with most of the human diseases lies in the proof that any given organism is the causal organism sought. We are compelled to resort to animal tests, and the lower animals are not as a rule susceptible to the disease under investigation. If the medical clinician has an advantage over his veterinary colleagues, the balance of advantage is more than redressed for the veterinary bacteriologist. In pleuro-pneumonia of cattle an exceedingly small coccus, just within the range of visibility of a good microscope, has been isolated in pure culture. The coccus grows readily on suitable solid media in minute colonies, and has been proved to be the causal organism by animal experiment. In this instance we have the one definitely successful culture of a filter-passing virus. Can the same success be achieved for foot-and-mouth disease? Maybe the coccus of pleuro-pneumonia is easier to grow than other filter-passers, but this cannot be affirmed until the attempt has been made. The technical procedure which is most in favour at the present time is that devised by THEOBALD SMITH and modified by NOGUCHI. The essential principle of the method is the employment of fresh tissue—usually kidney—a small piece of which is dropped into nutrient fluid. The medium thus produced is anaerobic and is suitable for the rapid cultivation of the ordinary large anaerobic bacteria. Coincident with the growth of an organism a haze develops, usually in the vicinity of the tissue, and this is transferred to another tube of the same medium in the ordinary process of subculture. Subsidiary lines of investigation consist in attempts to stain an organism or to examine the fluid medium under the dark-ground microscope. But the results obtained by such methods are generally unsatisfactory owing to the confusion produced by the occurrence of large numbers of particles which arise in the disintegration

of the tissue in the tube. The final and satisfactory proof that a living organism has been grown in such a liquid medium depends upon the successful production in series of definite colonies on solid media; and the proof that a pathogenic organism has been grown depends upon the successful reproduction of the disease under investigation in a susceptible animal by a remote subculture. The successes already gained in the study of filtrable viruses warrant us to be hopeful as to the outcome of an attempt to isolate the organism of foot-and-mouth disease. If there is any valid objection to such work being undertaken, it is on the ground of expense. It would be unwise to be driven into foolish or costly experiments; but when the present epidemic has died away, let us not fall into complacency.

ALCOHOLISM AND SOCIAL CLASSIFICATION.

WE publish elsewhere (p. 109) an abstract of a paper read last Tuesday before the Society for the Study of Inebriety by Dr. H. M. VERNON, in which he draws some valuable conclusions upon the factors concerned in the promotion and prevention of alcoholism, and in its incidence upon various classes of society, as displayed in the seventy-fifth annual report of the Registrar-General. This report relates to the period 1910–12, and the part played in the decline of consumption by high taxation or the reduced hours of sale is, therefore, not under consideration; but the information, and the deductions to which it gives rise, are none the less useful to all medical men, while the subject is treated by Dr. VERNON with the accuracy and suggestiveness that we should anticipate from one whose writings upon industrial efficiency and the related influence of fatigue have already given medicine so much to think about.

Dr. VERNON has simplified the classification of the Registrar-General by considering under one heading the five groups which can be described as "skilled and semi-skilled workmen," placing those engaged in the production and sale of alcohol in a separate category, while occupational groups, where the number of deaths from alcoholism and cirrhosis of the liver were very small, have been ignored, to the prejudice of certain more abstemious sections, but the effect of any error of judgment is annulled by the acknowledgment of the omission. The data relate to males between the ages of 25 and 65, and by comprising in one group all skilled and semi-skilled workmen the classes to be considered fall under five headings—namely: (1) this large combined group; (2) unskilled workmen; (3) professional classes; (4) shopkeepers; and (5) brewers and publicans. It is found that expressed as a percentage of a general mortality the alcohol mortality in all five is practically constant; for example, in the first group, with a comparative general mortality of under 600, there is an alcohol mortality of 7, while the next division had a comparative general mortality between 600 and 700, with an alcohol mortality of 10, and in succeeding divisions the alcohol mortality increased as the general mortality increased, save where the employees in the liquor trade manifested a worse rate. To show fully the significance of the correspondence between the two sets of figures it would be necessary to ascertain to what extent the general mortality is affected by alcoholic indulgence, and here certain evidence is obtained by comparing the cause of death in typical groups of individuals liable to indulgence with other groups not so liable, but otherwise of similar environment. Comparison has been made between the group whose members are engaged in the production and sale of liquor and the group classed as shopkeepers, which comprises drapers, grocers, butchers, greengrocers, ironmongers, chemists, and tobacconists. A tabular statement was given by Dr. VERNON recording the mortalities of the two groups from various diseases, when under each heading the mortality among the publicans was higher, whilst their mortality from alcoholism was vastly more sinister.

A distinct warning is given in Dr. VERNON'S paper that we must look elsewhere than to alcohol to account for the larger part of the variations in the general mortality of industrial workers. Those who work in the open air, as the Derbyshire coal-miner, those who work usually under cover, as the sawyer or the coach-builder, have their differences of environment, but in neither case are they subjected to the conditions which prevail in factory work with artificial heating; and among the coal-miners the mortality is low except from accidents, for although they are working underground and at high temperatures, there is circulation of air in the pits. Other groups of workers, as railway guards, bricklayers, ship-builders, give evidence of the importance of fresh air; and while the general mortality rises the moment we are dealing with typical indoor workers, such as cabinet-makers, boilermakers, or printers, it is higher still among the group engaged in iron and steel manufacture, pulmonary conditions exacerbated by exposure after overheating playing their rôle. The section with the highest mortality includes those exposed to dust inhalation, and those who, like the Lancashire coal-miners and operatives in glass manufacture, work in excessive temperatures. And the general lesson is that the relationship between the alcohol mortality and the general mortality of industrial workers is constant, but different from that among those engaged in the liquor trade. A division with a low comparative general mortality comprises medical men, lawyers, and artists. Here the alcohol mortality is higher than among industrial workers. The far higher alcoholic content of spirits over beer explains the discrepancy, but not the tendency towards indulgence which is displayed in a section of the community possessing full knowledge of its dangers.

THE PANEL INQUIRY.

THE Court of Inquiry appointed by the Minister of Health to determine the capitation fee to be paid to insurance practitioners during the year 1924 held three public sessions on Friday, Jan. 4th, and Monday and Tuesday, Jan. 7th and 8th. On the first day the case for the doctors was set forth in evidence by Dr. H. B. Brackenbury in amplification of the printed document drawn up by the Insurance Acts Committee. Dr. Alfred Cox and Prof. A. L. Bowley giving corroborative figures. Dr. Gordon R. Ward made a statement on behalf of the Medical Practitioners' Union. The case for the Ministry of Health and the Scottish Board occupied the remainder of the Friday and all the Monday session. A report of the proceedings of these two days appears on p. 97. On Tuesday evidence was given on behalf of the National Association of Assurance Committees mainly by the President, Rev. W. D. Yoward, M.A., and the Hon. Secretary, Mr. Edwin Potts, and the Ministry of Health replied, the final word being with Dr. Brackenbury. The Court will sit again on Tuesday, Jan. 15th, to hear the case presented by certain independent approved societies, their main case being reserved for a session on Jan. 21st. We hope next week to report two further sessions. All that need be said at present is that the proceedings of the Court were of a harmonious nature and the impression was given to all parties of a fair and courteous hearing.

Annotations.

"Ne quid nimis."

PUBLIC HEALTH WORK AT THE LEAGUE OF NATIONS.

THE Council of the League of Nations at its session in Paris last month decided on the names of the six medical members of the new Health Committee of the League who were required to supplement those who had already been nominated by the Office International d'Hygiène Publique. The six members thus chosen were Dr. Th. Madsen (Denmark), who has been President of the provisional Health Committee of the League since 1921, Prof. Léon Bernard (France), Prof. Ottolengli (Italy), Dr. J. Jitta (Holland), Dr. Pittaluga (Spain), and Dr. Chagas (Brazil). The members already appointed by the Office International d'Hygiène Publique were its President, Mr. O. Velghe (Belgium), Dr. Raynaud (France), Sir G. Buchanan (Great Britain), Dr. Lutrario (Italy), Surgeon-General H. Cumming (United States), Dr. A. Granville Pasha (Egypt), Prof. Ricardo Jorge (Portugal), Dr. H. Carrière (Switzerland), and Dr. Mimbela (Peru), an additional nomination for a medical representative of Japan being left open. The constitution of the Health Committee of the League provides for only 16 members in the first instance, but the Council recommended the Committee to add to itself two other nominees, Prof. Nocht, of Hamburg, and Dr. Chodzko, late Minister of Health at Warsaw, who represented Germany and Poland respectively on the former organisation.

The membership of the new Committee, which is appointed for three years, is distinguished and influential. It may, however, be objected that its personnel is too exclusively derived from the official public health services of the countries concerned, consisting as it does so largely of Government delegates of those countries to the older international office. This circumstance, however, follows naturally from the fact that the activities of the League of Nations in health matters must in the main be carried on through the government public health services of the world which the older office represents. It may be recalled that under its new constitution the Health Committee of the League is expected to act when necessary through special committees on which experts on particular subjects have been co-opted, and it may be anticipated that this practice will be extensively followed. A more serious and obvious criticism is that on the basis of representation by countries no place is found in the present list for any member of the important public health services of India, of the several British Dominions, or of British colonies. Steps should be taken, with as little delay as possible, to rectify this omission from the constitution of a body which demands, and has hitherto received, welcome participation from all parts of the British Empire. The Health Committee will hold its first session under its new constitution at Geneva in the course of February, when reports of the League's commissions on quarantine measures in the Far East, on the unification of standards for therapeutic sera and of serological tests, on the opium traffic, on standardisation of "biological" remedies, and on international comparisons of cancer mortality will be taken. The Office International d'Hygiène Publique at Paris now acts officially as the advisory health council of the League, and at its regular sessions will in future have an account of the work of the Health Committee of the League before it for consideration, and the opportunity of making proposals for increasing the usefulness of the League's organisation for promoting international measures of public health.

A summary of the work of the last session of the permanent committee of the Paris office was included in the November number of the monthly bulletin of the Office International. In addition to the settlement of matters affecting its future as an advisory body to the League of Nations, while remaining otherwise autonomous, the delegates decided on the final text of the international nomenclature of causes of death, which had been left in doubt owing to the death of Mr. J. Bertillon. They established the existence of a wide difference of expert and administrative opinion on the American proposal that heroin should be prohibited for medical purposes, and settled the form of the proposals to be made to the Governments represented regarding international agreements relating to the composition of anti-diphtheritic serum and the adoption of a uniform pattern of Bill of Health for shipping purposes.

TUBERCLE IN THE FRENCH ARMY.

THE *Archives* of Military Medicine, which is the official journal of the French Army Medical Corps, devoted its last number (vol. lxxix., No. 1) wholly to the consideration of tuberculosis in the army, the chief paper being a long and careful discussion of the question from the practised pen of Médecin-principal M. J. L. R. A. Jeandidier, who with all his study is not very hopeful. He concludes that tuberculosis in the army only reflects the conditions of civil life, the morbidity being lessened, however, in the army by the selection which goes on when the recruits come up to join. What, then, is doing in civil life to get rid of this plague? We cannot destroy the infection; vaccinations have so far failed; now we are trusting that if we ward off massive infections, the small doses that will be received will set up a relative immunity. "Unable as yet to prevent tubercle," Colonel Jeandidier puts it, "we await protection by universal tuberculinisation." The army might be protected by the exclusion of all possibly unsound recruits, but that weapon is blunted from the start, for France, though she has only a small population, needs a large army. Hence the army cannot get rid of this scourge, but can only lessen it. This it can do in several ways: (1) In liaison with civil agencies; (2) by giving anti-tuberculous instruction to the soldier in barracks, not only to the sick in hospital; (3) by early diagnosis, and swift isolation and discharge of the infected; (4) by making selection as careful as possible at entry; (5) by constant, assiduous observation of the doubtful whom the army has to receive; (6) by strict application of hygienic measures; methodised training; sufficient, varied, and well-cooked food, healthy housing, sufficient warming, enough clothing, good medical treatment. But having enumerated all these points Colonel Jeandidier comes back again to the basic fact that since a definite number of recruits are required every year, they cannot be obtained if all the suspicious are excluded; so far the balance has been found from colonial troops, themselves very susceptible to tubercle. The alternative—namely, long service for sound men—is too expensive. Every hygienic measure means more expense, for the new watchword "Selection and hygiene" is just the familiar "Men and money." Can they be found? Or must it be admitted that the watch-dog costs so much that the house must be left open to the thieves? Colonel Jeandidier leaves it at that.

CHRONIC ULCERATIVE COLITIS IN CHILDREN.

IN a paper read before the last annual meeting of the American Pediatric Society, Dr. Henry F. Helmholz,[1] of the Mayo Clinic, has recorded five cases of chronic ulcerative colitis in children aged from 8 to 15 years. Four of the cases had been under his own observation, and one had already been published by Logan, who in 1919 had defined the condition as a chronic inflammation of the large bowel of unknown ætiology, and showing all grades of inflammation from a reddened, congested, easily bleeding

[1] American Journal of Diseases of Children, November, 1923.

mucous membrane to superficial and deep ulceration with constant or recurring dysentery lasting from many months to several years. In none of Dr. Helmholz's cases was it possible to demonstrate the presence of any pyogenic, dysenteric, amœbic, or tuberculous infection. In four cases the colitis started acutely with a bloody diarrhœa, and in only one instance was the condition chronic and not accompanied by diarrhœa. The ulceration begins in the lower part of the bowel, and in the course of the illness the entire colon is involved. The ileum is rarely affected. On proctoscopic examination the ulcers are usually most marked in the rectum and lower part of the sigmoid. The colon as a rule is thickened. In severe cases only small islands of normal tissue are left, the entire surface being ulcerated and presenting a granular appearance. X rays show marked narrowing and absence of haustrations of the colon. The stools are usually five to ten in number daily, and contain a considerable amount of muco-pus and blood, frequently in clots. If there are no complications the temperature is usually not raised. Acute arthritis, which is frequent in adults, was seen in only one of the present series. The diagnosis is based on the occurrence of muco-purulent diarrhœa, with the passage of considerable amounts of blood, usually in clots, the persistence of the dysentery in spite of all medical treatment, and the absence of any of the usual ætiological factors. The prognosis under medical treatment is bad, as was illustrated in the present series of cases which did not show any improvement until after surgical intervention. The operation of choice is Brown's method, which consists of an ileostomy, with the establishment of a complete fæcal fistula through which the colon can be irrigated.

FOCAL SEPSIS.

NOT the least useful of the functions performed by a medical congress is that of concentrating general attention on the more outstanding problems of the moment. This was reflected at the recent Australasian Medical Congress of the British Medical Association in Melbourne, the first of its kind ever held in Australasia, which covered six days, and was concluded on Saturday, Nov. 17th. One of the most interesting discussions was that on Friday afternoon, dealing with focal infection in relation to general disease. Dr. R. Scot Skirving, of Sydney, who opened the discussion, urged that all definite septic foci should be treated by radical removal, whether they were thought to be responsible for general disease or not, a conclusion with which it is difficult to quarrel; but the scanty nature of the evidence linking such foci as dental abscesses even with diseases such as rheumatoid arthritis and pernicious anæmia was rightly emphasised by several subsequent speakers, including Prof. A. E. Mills, of Sydney, and Dr. S. O. Cowen, of Melbourne. In our last issue we reported a discussion on pneumococcal infections which took place at the meeting of the Manchester Pathological Society on Dec. 12th, Dr. J. H. Dible's opening paper appearing in full in the same number. The opinion of the pathologists, including Profs. Shaw Dunn and Matthew Stewart, appears to be trending strongly towards the view that such infections are more often due to local spread than has hitherto been believed. Dr. Dible in his concluding remarks crystallised such belief by saying that he felt that the hæmatogenous theory of invasion had been overthrown in two of the chief pneumonic infections, and that bacteriologists as a whole realised that the blood in most bacterial infections was well able to look after itself.

The whole theory of the responsibility of oral, pharyngeal, and intestinal sepsis for general arthritis, anæmia, gastric and duodenal ulceration, dermatitis, and a host of other diseases, still rests upon the flimsiest of bases. The experimental studies [1] of E. C. Rosenow, which at first appeared to throw a flood of light on many pathological problems of magnitude, have, as far as we are aware, never been adequately confirmed. Lord Dawson, speaking from the chair of the Medical Society of London, referred some 12 months ago to the importance of this omission. Rosenow's work seemed to show that streptococci, cultivated from the septic teeth of a patient with gastric ulcer, would, on injection, often produce such ulcers in rabbits. This, and many similar observations by the same worker, seemed to supply the long-sought evidence. Published in 1919, the experiments are not yet accepted by the majority of pathologists. At the same time there is no ground for entire scepticism on the subject. The Wassermann reaction gives us evidence of a general infection from a small primary syphilitic sore, which it would be impossible to obtain otherwise. Yet Prof. Fourneau, of the Pasteur Institute, has been able to synthesise a drug which, taken orally, will prevent syphilitic infection in human beings or monkeys when the spironema is inoculated into a skin lesion. This is the latest result of a belief in the relation of general to local infection which is clearly sound though not based upon microscopic bacteriological evidence.

The consolidation of the dental profession presents a fitting occasion for a more thorough investigation of the problem of focal microbic infections, and we suggest that, in view of the importance of the subject, the Ministry of Health would be well advised to organise a complete inquiry into the matter.

[1] Journ. of Dental Research, 1919, i., 215.

"THE KIND OF NURSE SHE WANTS."

A LETTER with this heading was published in our issue of Dec. 1st, 1923, from a writer who complained that the employment of trained nurses was very embarrassing to small householders, and indicated that there were many illnesses where the patient only needed "someone to wash me, to bring me my food, to make my bed, and in fact to attend to my physical needs" for which services a trained nurse was not required. The writer gave expression to a really great public need, but made no suggestion how it should be met, and we confess that our own position is somewhat similar. Once again we have an example of social progress where in the course of the progress certain of the old amenities are lost.

For the last 40 or 50 years the whole course of opinion, we may say of civilisation, has tended to develop a nurse highly educated in theory and highly trained in practice. Such a nurse can be trusted not only to take the patient's temperature and pulse, to keep an accurate note of excretions, and to make simple analyses, but also to record with intelligent comprehension much clinical observation. Further, the modern nurse is familiar with the details of aseptic surgery, and thoroughly capable to assist a surgeon in a difficult operation This highly finished product is valuable, is properly aware of the fact, and has developed a sense of professional self-respect. For the cases that need her she is exactly what is needed. But for the writer of the letter in our columns she is not "the kind of nurse she wants." And where serious sickness is not in question the position and capacities of the modern-trained nurse may prove an embarrassment, especially if she be without tact. She is herself well educated in her own subject, but often ignorant of the world from other points of view, owing to the semi-conventual life of a hospital, although we believe this is less so than a few years ago. She may find herself unwelcome in a house, and be aware that her emolument is adding to the cost of an already expensive illness. Her ways are not the ways of her employers, any more than her people are their people. And employers are often selfish and tactless, when the illness is not one where every detail in the life of the household has to be subordinated to the claims of the sick and the sick-nurse.

It is not, therefore, a matter of wonder if those who are invalids rather than acutely ill, should desire

some simpler and less expensive attendance than is given by a trained nurse, while it seems clear that it is not from a trained nurse they should expect it. Those who are in the situation of our correspondent really want a domestic servant with some knowledge of nursing routine such as might be picked up by a brief sojourn at a cottage hospital. In three months a lady's maid, an intelligent parlour-maid, or a housemaid might be given enough training to make her a valuable adjuvant to the patient and the doctor in cases of invalidism. Fifty years ago such patients were always nursed in this manner; they were saved both from strange hands and strange ways, and from the heavy expense attendant thereon. Is it possible that a system should arise whereby a class of nursing-maid could be created? Or must any attempt to organise such a grade of nurses mean underselling the existing highly qualified service, with some risk of putting a premium on ignorance? In America the Rockefeller Foundation definitely advises the creation of a nurse of this simpler kind. It proposes that she shall have about nine months of training and be registered in her own class. Anything like a second register in this country would be opposed on general lines as retrograde, and a letter from Miss Muriel Payne, in our issue of Dec. 29th, shows that this apprehension has grounds. Nevertheless the suggestion has been made of making a register of handywomen who are not qualified midwives, and this dual scheme of maternity helps has the support of the Ministry of Health. But apart from a definite register of nursing-maids, use might be made of certificates from the cottage hospitals. The district nurse is not in question. She is a fully trained nurse who has specialised in house-to-house work after certification. She would be one of the very best agents for sanitary education in the kingdom if the county authorities had their eyes open, and if the public had learned to appreciate her rôle, and it is certain that in course of time she will come into her own. But she is not fitted for the work now under consideration. If any organised body could produce the requisite article it would probably be one of the Cottage Nurses' Associations. They might, if there was a demand, supply the kind of nurse required, or even, as in other industries, create the demand by offering the supply. That there is considerable need of some such nursing we have no doubt at all, but at present neither the demand nor the supply is organised.

INSECT PESTS.

MAN is so sure that he is the only live thing which matters very much that he is always quite ready to urge that if bacteria are not the most important group insects certainly are. And the recent progress of knowledge has emphasised the parts played by them in all sorts of directions centring round human activities and interests; the species of insects are so numerous that it is little wonder that they do a great variety of different things and turn up in one form or another almost everywhere. Mr. R. A. Wardle and Mr. P. Buckle have put together a most interesting survey[1] of the methods which are available for keeping insects within reasonable bounds. For the most part the authors deal with insects in relation to vegetable crops, and it is interesting to notice how the cultivation of great quantities of the same plant in an area has brought pests into prominence. This is due, no doubt, partly to the demand for a higher standard of healthiness by the cultivator, and finds its parallel in the refinement in human beings which has come to call the common cold a "disease." But it may be attributed mostly to the effect of aggregating large populations together and giving the parasites a larger field to work over in their business of breeding out virulent races. It is when the give and take of natural conditions is artificially broken up that parasites get their real chances; market gardening on the modern scale has much the same effects as compulsory elementary education and urbanisation in general. And the problem in this particular branch of economic entomology is just the same as confronted the early human sanitarians, such as Chadwick, whose portrait Mr. Lewis has been exhibiting so effectively in Oxford-street. Along lines such as these the whole problem of the control of plant pests is of great interest to anyone concerned with human hygiene; the parallels and differences might profitably be discussed by both groups of workers, for each will get help from the other. The items of immediate medical interest are not treated at all fully; mosquitoes receive some attention, but fleas and bugs are mentioned only casually and *Glossina* apparently not at all; lice and ticks are dealt with in more detail. Domestically, several methods are noted for cockroaches, but the only reference to furniture beetles is a mention of the thermal death point. The book does not, indeed, purport to be an exhaustive encyclopædia of what has become a vast subject; and it is better that it should not be so. Though it is not very well written and the paragraphing is bad, in its present form it will afford interesting and suggestive reading to many people who are not immediately concerned with agriculture at all, and the ample bibliography at the end suggests how easy it would be to follow up any particular point.

[1] The Principles of Insect Control. By R. A. Wardle, M.Sc., Lecturer in Economic Zoology in the University of Manchester, and P. Buckle, M.Sc., Lecturer in Agricultural Zoology in the University of Durham. Manchester: University Press. 1923. Pp. 295. 20s.

TWO ROCKEFELLER GRANTS TO CLINICAL MEDICINE.

AT the end of last year announcement was made of two substantial donations by the Rockefeller Foundation towards clinical teaching in Great Britain. Some details of the Edinburgh grant were given by our Scottish correspondent in our issue of Dec. 29th. It had been recognised for some time that the facilities for clinical research and for advanced teaching in both medicine and surgery were not adequate for a school with the reputation of Edinburgh, and it was in order to meet this need in some degree that the grant was made. Of the total sum of £50,000, £33,000 are to go towards the building and £2000 towards the equipment of a medical clinical laboratory. In order that the director of the laboratory may be free to devote himself to this development, a further grant of £1000 per annum has been made for five years to supplement his salary and that of his staff, and to enable him to make necessary additions to his staff. As regards surgery, it is planned to unite the two existing chairs of systematic surgery and of clinical surgery under one whole-time professor, and, subject to the completion of these plans, a sum of £15,000 will be applied to augment the endowment, so that the salary of the professor may be approximately £2000. The remaining sum of £750 for five years will be available for additional salaries rendered necessary under the scheme.

In making a donation of £14,000 to the Welsh National School of Medicine the Rockefeller Trustees warmly approved the ideal of a National College of Medicine for the whole of Wales, and the adoption of the unit system of teaching in the final years of medical study. Two other factors which, we understand, influenced the Trustees in their decision were the public-spirited response of local authorities in Wales to the recent appeal on behalf of the medical school—the product of one-eighth of a penny rate was conceded—and the fact that the Cardiff Royal Infirmary has now allocated the minimum number of beds needed for a medical unit. The gift is regarded as a landmark in the history of the medical school and is worth far more than its mere monetary value. The prestige attached to recognition by the Rockefeller Foundation will be of particular benefit to a school which has taken such a definite line of its own in medical education.

CARCINOMA OF LINGUAL THYROID.

ACCORDING to Dr. Albert F. Tyler,[1] of the Department of Roentgenology, John A. Creighton Medical College, Omaha, who reports an illustrative case, the term "lingual thyroid" is applied to a tumour in the root of the tongue due to failure of the thyroid to migrate to its normal position during embryonic development. The condition was first described in 1853 by Vernueil, who discovered it in dissection of the insertion of the muscles of the tongue to the hyoid bone. The first case reported in American literature was that by Bernays in 1888. In 1922 Hartley collected 44 cases, including one of his own. The condition is found at all ages. In Hickman's case the tumour was of sufficient size to produce suffocation in a new-born child, while Staelin's patient was a woman, aged 77. Although present from the first month of intra-uterine life lingual thyroids seldom produce symptoms before the period of sexual activity, so that they are usually recognised between the ages of 15 and 40. Of the 45 cases now on record, 41 were in females and only four in males. The tumour is usually situated above the hyoid bone in the posterior portion of the tongue at the site of the V-shaped groove. It most frequently occupies a lateral position, though occasionally, as in Bernays's case, it is located centrally surrounding the foramen cæcum. It is usually ovoid in shape, and varies in size from 0·5 to 5 cm. in diameter. The mass usually produces a prominence on the dorsum of the tongue, and when it has reached a certain size projects downwards beneath the mandible and above the hyoid bone. The principal symptom is a feeling of pressure in the throat, causing dysphagia or dyspnœa. A desire to "clear the throat" is usually present for several years before the cause is recognised. Occasionally profuse hæmorrhage occurs from rupture of one or more of the enlarged vessels in the growth. Lingual thyroid must be differentiated from other tumours which occur at the base of the tongue, such as sarcoma, lipoma, angioma, gumma, and lingual tonsil and cyst. Medical treatment in the form of administration of sodium iodide or other drugs has little or no effect. The use of the galvano-cautery should be avoided owing to its inability to remove all the thyroid tissue. Surgical enucleation by the intra- or extra-oral route is the best treatment. The use of X rays is beneficial in cases where removal is impossible or malignant degeneration has taken place. Dr. Tyler's case, which occurred in a man aged 54, was remarkable for the fact that the tumour which had first been noticed eight years previously had undergone malignant degeneration and was complicated by metastases in the lungs. Complete removal was impossible, but X rays and radium caused considerable relief, although the case ended fatally.

[1] Journal of Radiology, November, 1923.

THE MODERN CAVE-DWELLER.

THE Henry Saxon Snell Prize, founded by the Royal Sanitary Institute to encourage improvements in the construction or adaptation of sanitary appliances, is to be awarded this year for the best essay on Improvements in the Sanitary Conditions of Underground Dwellings and Small Underground Workshops. The present situation is thus summarised in the circular[2] announcing the conditions of the award.

Throughout London and most large cities, houses of all grades are generally built with basement stories, partly if not wholly below the level of the adjoining street. These basements are used for living quarters and often for offices or workshops. This has been due mainly to the great cost of land, and in a lesser degree to the difficulty of obtaining satisfactory foundations at a comparatively high level. In the old type of house, too, the basement story made it possible to isolate the service and working departments. Economy of ground space was, however, and still is, the ruling factor.

Obviously, without special precautions, these basements cannot compare with the upper floors in the matter of light, cleanliness, and ventilation. A typical London basement is lighted and ventilated from areas at the back and front. These areas vary in width and space according to the grade of the house. Generally there are, beyond the narrow areas in front, vaulted cellars, which may be, and generally are, used for storing coal and coke. Outside in the area are one or more dustbins (from which much dust must escape whenever they are opened for new accretions), and a manhole and fresh-air inlet. The coal, too, may be more or less wet, and the coke will give off sulphurous fumes. The cellars themselves are probably reeking with damp owing to the want of damp-proofing.

Dust from the road will, of course, find its way into all the lower floors of a house, but the basements get the heavier particles, which may be largely composed of horse-droppings, &c. Only too often the area in the rear is in time covered over, and through ventilation ceases. Basement floors are often "solid"—i.e., laid direct on to the ground concrete, and are comparatively colder than the upper floors, even if they are not actually damp.

These are the conditions which have to be faced at the present time. To forbid the use of basements as habitations or workshops might be desirable, but it is not practicable. The Sanitary Institute has been well advised is asking for the coöperation of practical sanitarians in obtaining suggestions as to arrangements that can be made and appliances that can be used for overcoming admitted defects in a really practical way, not prohibitive in cost. It is no use to tell a cave-dweller that he ought to dwell elsewhere when no other dwelling is available for him or his family.

[2] The prize is of the value of 50 guineas and carries a medal. The address of the Royal Sanitary Institute is 90, Buckingham Palace-road, London, S.W. 1.

TREATMENT OF LETHARGIC ENCEPHALITIS.

Dr. Hans Hoff [1] gives the following account of the various methods of treatment for lethargic encephalitis employed in the Vienna University Clinic for Psychiatry and Neurology from Jan. 1st, 1916, to May 30th, 1923. Intravenous administration of urotropin as recommended by Economo was employed in 28 cases. The doses consisted of 10 c.cm. of a 10 per cent. solution and ten or more injections were given. The therapeutic effect was almost negative, or at least slight. Economo also made use of iodine in the form of a 50 per cent. solution of sodium iodide or of Pregl's solution,[2] given in doses of 10–150 c.cm. until a total of 1000–1500 c.cm. had been injected. The doses of sodium iodide solution ranged from 4–20 c.cm., a total of 300–400 c.cm. being injected. This method was followed by some improvement, especially in the myoclonic forms, but could not prevent the disease becoming chronic. In forms with meningeal symptoms injection of staphylococci and meningococci caused considerable improvement of these symptoms. Much benefit was also derived in acute cases from a combination of sodium iodide or Pregl's solution with Besredka's typhoid vaccine intravenously, but in chronic cases the results were disappointing. When typhoid vaccine was used by itself considerable improvement took place in the lethargic forms of the disease. In a number of acute cases, vaccineurin—i.e., a combination of the autolysats of *B. prodigiosus* and staphylococcus—was employed with very satisfactory results and appeared to prevent recurrences, but in chronic cases had no effect. In about 25 per cent. of the patients suffering from the chronic sequelæ of encephalitis, including a number of cases of Parkinsonism, inoculation of malaria was of some value, but the improvement was not very considerable. Intravenous injection of sodium cacodylate as recommended by French observers in doses of 0·5 to 2 c.cm. of a 50 per cent. solution appeared to produce some improvement in Parkinsonism and the other sequelæ of encephalitis, but not to any great extent. Dr. Hoff

[1] Wiener klinische Wochenschrift, Dec. 20th, 1923.

[2] Pregl's solution: a watery solution containing about 0·04 per cent. free iodine, together with sodium, iodine, hypoiodite, and iodate in ionised form, as defined in the excellent German medical dictionary of Guttman (Medizinische Terminologie. Berlin: Urban and Schwarzenberg. 1923).

concludes that acute encephalitis is amenable to treatment, but that the sequelæ of encephalitis, especially Parkinsonism, have hitherto proved refractory to any form of treatment in most cases.

SEASONABLE ADVICE ON BRONCHITIS.

"IN this cold, damp climate many aged persons contract a fatal bronchitis in bed." These words, from the address on bronchitis delivered by Sir James Barr before the Huddersfield Medical Society on Wednesday last, epitomise the experience of the majority of medical practitioners. The importance of this malady is shown by its position amongst the fatal diseases recorded in the Registrar-General's report, where it ranks above pneumonia, and only just below tuberculosis and cancer. A lecture on such a subject from an authority with years of clinical experience behind him is accordingly of practical interest to us all during the full rigour of the winter. For Sir James Barr emphasises the fact that though the ultimate scientific explanation of the relation of climate to the disease may have changed, yet the importance of atmospheric factors remains as great as ever. The following passage is in his own words:—

"A chill due to exposure is undoubtedly an ætiological factor in the causation of bronchitis, but you must clearly understand what you mean by a chill; a cold, dry, still atmosphere much below the freezing-point cures the bronchial catarrh often associated with tuberculous disease of the lungs. It is a cold wind with a moist atmosphere which chills you to the bone, and finds out the weak spots in your economy. When a person is feverish or well supplied with internal fuel he can stand much external cold. There are on record cases of typhus fever who in their delirium escaped, and after living for some days in the snow without food or clothing recovered. It is quite another matter when the internal temperature is subnormal, and the vital powers depressed from any cause. When the vital resistance is lowered, and especially during sleep when the controlling influence of the nervous system is partially suspended, the individual is much more liable to the catarrhal effects of cold, hence bronchitis is much more frequent and fatal in the very young and very old than in adults."

Sir James Barr is confident that immediate treatment can abort or cut short many cases if dealt with promptly. He says: "When a person after a severe chill has some distress in breathing he should have a warm mustard bath, be put to bed in a warm room, and, if he still feel chilly, have a glass of hot punch. A conscientious teetotaller can have a bowl of hot gruel, but as a rule, teetotallers do not object to punch so long as it is prescribed as a medicine—the only danger is that they may be getting a chill too often. After this he should have no food for 24 hours, but may have plenty of hot water. He can have a Dover's powder, or Sir Archdall Reid's universal panacea of Dover's powder with aspirin and phenacetin. The following morning he should have a saline purge and then remain in bed for two or three days on a starvation diet. By the end of that time he will probably tell you that he is all right, and does not know why you have made such a fuss over a chill. However, when he hears of some of his neighbours dying under similar conditions he will feel more grateful." In a later passage attention is drawn to the importance of the vital as opposed to the merely microbic factor in many of these cases. Speaking of acute suffocative œdema of the lungs, Sir James Barr says: "The pneumococci play a very small part in these cases . . . . the pneumococcus is not such a virulent organism as to kill in a couple of days, even pneumonic plague would scarcely act so rapidly." He assures the practitioner that continuous vigilance on his part is the one road to safety. "By sticking to your patient until you see him past the danger signals you can do far more good than any consultant who comes in, prescribes, gives his opinion and prognosis which may or may not turn out correct, and," adds the speaker drily, "disappears with his fee."

Modern Technique in Treatment.

A Series of Special Articles, contributed by invitation, on the Treatment of Medical and Surgical Conditions.

LIII.—THE ACUTE MENTAL CASE:

ACUTE CONFUSION OR DELIRIUM.[1]

FOR the purpose of this article acute mental cases may be classed in three general groups—viz., acute confusion or delirium, acute depression, and acute excitement. Each of the types may have a rapid or even a sudden onset, and the difficulties of treatment are increased from the outset by the practitioner's frequent and very natural lack of certainty as to diagnosis, prognosis, and duration.

The immediate problem in every case is the decision whether the patient is to be treated at home or removed to a mental hospital. In arriving at this decision, which is often a very important and difficult one, the following considerations must be carefully weighed.

Acute Confusion or Delirium.—The patient's life is, or may at any moment be, in grave danger, and without constant skilled nursing, as well as careful medical treatment, he will very probably die. On the other hand, the duration of the acute illness will probably only be a matter of a few weeks, or often less; the prognosis is excellent if the patient's strength can be maintained; there is nothing in the treatment which the practitioner need hesitate to undertake, given skilled nursing assistance, and there are very understandable objections to applying the present legal machinery of "certification" to a case of acute recoverable illness, which is at least as much bodily as mental.

Acute Depression.—The duration cannot be forecasted, though recovery is a practical certainty. Continual observation and attention will be necessary, various alterations may be required in the accommodation and furnishing of the house, and the patient and his relatives are apt to have a bad effect on each other.

Acute Excitement.—As in depression, the duration is uncertain and the prognosis very good. The patient will need not only observation, but skilled guidance and care, and even with this his state will in all probability cause considerable alarm and distress to those in the house or to near neighbours from time to time.

From this summary it will be seen that the question is largely a financial one. In a reasonably suitable house there is no reason why the treatment of the most acute case should not be undertaken at home, granted the possibility of obtaining ample nursing assistance. Financial and other considerations, however, often combine to make it more convenient to send the patient to a mental hospital. It is always wise to call in, whenever possible, a colleague with special knowledge of psychiatry to share the responsibility of the decision. It will be understood that there are many other types of mental case of more gradual origin and chronic course which may obviously be treated at home without difficulty, or in which there may be other alternatives to home treatment than that of admission to a mental hospital. We are limiting our discussion, however, to acute cases, and what follows is on the assumption that the patient is being treated at home. Only specially important points are referred to, a comprehensive discussion of treatment being impossible in the allotted space.

Acute Confusion or Delirium.

The cases in this group have been variously named and classified as "acute confusion," "acute delirious mania," "the infective exhaustive psychosis," &c.

[1] An article on the home treatment of Acute Depression and Acute Excitement will appear in the next issue of THE LANCET.

The two elements of infection and exhaustion are invariably present, and the more obvious and specific the toxic element is, the more rapidly effective is treatment likely to be. Most acute alcoholic cases are to be included in this class, as also are the cases following childbirth—"puerperal insanity." A typical case recently under care occurred in a naturally nervous and poorly-nourished youth after a minor surgical operation which had gone septic. In considering treatment it is to be remembered that all these cases are essentially similar to those of delirium occurring in, say, enteric fever, or sometimes even in pneumonia. A short prodromal period of semi-stuporose confusion, with vacant appearance, disconnected answers to questions, and fitful attention is common. A patient in such a state may pass into acute delirium at any moment. If not already in bed he must be put there at once, and the services of two thoroughly competent nurses secured without delay. The characteristic signs rapidly make their appearance: great restlessness, rapid pulse and respiration, furred tongue, sordes on lips, large and sluggish pupils, incontinence of urine and fæces, and vivid hallucinations of hearing or sight, with muttering rambling incoherent talk or shouting. Great rise of temperature is not a feature, but a four-hourly chart will rarely, if ever, fail to record some degree of fever. The routine measures are obvious. Quietness, coolness, the absence of glaring light, and abundance of fresh air are essential. Though incontinence is the rule, there is often difficulty in getting the bowels to act in the early stages, and occasionally retention of urine occurs. Finally, careful physical examination must never be omitted. Acute conditions of the appendix, kidney, ovary, and other organs are often overlooked in delirious cases by physicians who have been blinded to the physical possibilities by the prominence of the mental symptoms. Any specific source of toxæmia or local source of infection will be sought for and treated with all energy. In a puerperal case, for example, any abnormal symptoms, such as offensive or suppressed lochia, will be treated as gynæcological and obstetric principles direct. In alcoholic cases, the wisdom of giving small doses of alcohol from the outset has been definitely established. In the absence of any special indications, the treatment is one of a general toxæmia of unknown origin. Blood cultures have been repeatedly made in such cases in the hope of finding some specific organism but with little success. Many of the patients show large numbers of septic sores and pustules which suggest a septicæmic state, and vaccines may be prepared from these and used. Search has long been made for substances which, when injected, will produce a sustained and beneficial leucocytosis in these cases, but whatever may be the theoretical merit of many with which experiment has been made they are rarely of practical help in treatment. Rectal salines are of great use, but it is almost impossible to get the patient to retain them. The constant and exhausting restlessness may sometimes be quietened by tepid sponging, and a cold pack sometimes works like a charm. Frequently, however, the restlessness is so intense and noisy that sedative drugs must be given. This should never be unduly delayed. Such drugs wisely used are a direct means of combating the intense and frequently fatal exhaustion which the sustained restless struggling is doing much to hasten. Paraldehyde is by far the safest and best. It can be given in doses of half an ounce with perfect safety, and repeated ad lib. In a really acute case, however, it may fail to act for more than a very short time, if at all, and recourse must be had to more powerful agents, of which a mixture of morphine (gr. ¼) and hyoscine (gr. 1/75) is probably the best.

Most important of all is the question of food, and it is here that the course of the case lies so largely in the nurse's hands. Not only are the patient's digestive functions more or less in abeyance, but complete refusal of food is a usual characteristic of these cases. Any form of liquid nourishment which the patient can be induced to take is permissible. It should, of course, be given often and in small quantities, and a food chart must be kept on which the amount and nature of the food, and the time of its administration, are noted. The patient is usually far too ill to show any preference for one variety of nourishment rather than another, but may sometimes do so in obedience to hallucinations, or perhaps during a brief lull in his condition. Any such preference should at once be regarded. If the refusal of food is absolute and continued for a day, tube feeding must be resorted to without hesitation. This is an infinitely simpler proceeding than is often imagined, and may be carried out with perfect safety and confidence by any practitioner. The nasal method is easiest and best. The tube should be about the size of a No. 15 catheter, and is joined by a small glass connexion to another rubber tube and glass funnel. The rounded distal end slightly lubricated with oil or glycerine is passed quietly and steadily along the floor of the nose. It will be found that one nostril is almost always very much easier than the other for this purpose. When the tube goes down into the back of the throat it is still moved gently and slowly onwards until a swallowing reflex is evoked and one can feel that it is within the grasp of the pharynx. It can then be pushed boldly onwards. Occasionally, owing to very rapid insertion or undue softness of the tube, it curves forward into the mouth instead of passing into the œsophagus, in which case it must be withdrawn and another more gentle attempt made. The only possible danger is the entrance of the tube into the larynx, and this is so exceedingly rare and produces such obvious signs when it occurs, that it need be no ground for hesitation or alarm. The proceeding is by no means painful, but a delirious patient usually has to be carefully held and controlled while it is carried out. There are many methods of doing this, a simple and effective one being as follows: The patient being on his back, one assistant lies across the bed, his chest coming over the patient's thighs well above his knees. With his hands, which are both free, this assistant holds the hand of the patient which is furthest from him. The second assistant holds the other hand, while a third controls the head, with the aid of a broad towel round the patient's forehead, if necessary. By this means the most violent patient can be controlled with perfect ease, and without possibility of harming him; but in many cases two assistants are amply sufficient. After the tube has been passed, it is wise to introduce first of all a small quantity of water through the funnel to satisfy oneself that the tube has been properly passed into the stomach and that the passage is clear. Milk, custard, and liquid foods of all kinds can be administered in this way, as well as any necessary aperient or hypnotic drug. Sugar and fruit juice are useful additions to a feed. Unfortunately, delirious cases show a remarkable tendency to vomit the food given almost as it enters the stomach. Deftness in introducing the tube and rapidity in withdrawing it will do much to prevent this, but it is a constant and troublesome complication. On more than one occasion during the war, when facilities for dealing with such cases were not good, I had to resort to administering a general anæsthetic after the introduction of the tube, and giving the food and withdrawing the tube while the patient was anæsthetised. This, however, is a last resource, which is not to be recommended. The giving of small quantities greatly lessens the risk of vomiting and a preliminary wash out of the stomach is often of help. As the most intense phase of the delirium passes, the patient can generally be induced to take sufficient food of his own accord. Improvement is rapid, though the confusion tends to come and go in waves before it finally disappears. The further treatment is that of convalescence from acute, exhausting, and dangerous illness.

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Special Articles.

MEDICINE IN PARLIAMENT.

DEATH CERTIFICATION: AN AGREED BILL.

THE House of Commons, when it is formally opened on Jan. 15th, will include ten medical men among its Members, and if the position of the political parties in Parliament is likely to limit the passing of controversial measures, there is the better opportunity to pass certain non-controversial measures on matters connected with public health.

Law of Death Certification as it Stands.

One such matter, on which legislation is long overdue and which might claim the immediate attention of the Medical Committee, is the certification of death. There seem only two possible elements of controversy: one is the criticism which might be focused upon the suggestion that a number of new officials were being created; the other is the prospect of adding fresh burdens to those which the taxpayer already endures, although money spent on improving our knowledge of the vital statistics of the people may perhaps more properly be regarded as an investment. There is an urgent need for a Bill which will leave no room for the certification of death on insufficient information and which holds out reasonable prospect of eliminating the risk of premature burial or of failure to detect foul play. The present condition of the law is admittedly unsatisfactory. The Select Committee on this subject in 1893 reported that it was possible for evilly-disposed persons to inform a doctor that a patient whom he has been attending has died when such is not the fact, and to obtain a certificate of the cause of death based upon the doctor's previous knowledge of the case. The significance of this was shown in a remarkable trial at Edinburgh six years ago, when two women were charged with thus defrauding insurance companies between the years 1912 and 1917. There were some strong judicial remarks when the judge discovered that the Births and Deaths Registration Act did not prevent a doctor from certifying death without seeing the body. The Departmental Committee on Coroners' Law in 1909 reported that the existing state of the law "offers every opportunity for premature burial and every facility for the concealment of crime." Two Bills, on which we commented at the time,[1] Major L. Molloy's "Coroners' Law and Death Certification (Amendment) Bill" and Dr. A. Salter's "Deaths Registration and Burials Bill," were introduced into Parliament last year, but made no headway. An agreed Bill has now been drafted by a committee convened by the Federation of Medical and Allied Services. It omits Dr. Salter's proposals for "Public Certifiers of Deaths," and it excludes some of the provisions made by Major Molloy for the improvement of the law of coroners. It contains the main safeguards which the two previous Bills were designed to secure; it should not be costly to work, and we recommend it to the support of the medical profession in and out of Parliament.

Provisions of the Agreed Bill.

The chief features of the Bill are these. It proposes that, when a death occurs, information shall be given to the registrar within two days instead of the five-day period at present allowed by the 1874 Act. Every death and every stillbirth is to be registered, but no registration is to take place unless and until the registrar has received a medical certificate first of the fact of death, and secondly of the cause of death. The fact of death is to be certified by a registered medical practitioner who has viewed or examined the body and is satisfied that life is extinct. If possible this will be done by the doctor who last attended the deceased; if this is not possible, the person whose duty it is to notify the death must inform the registrar, and the registrar within 24 hours must inform the coroner, the coroner then appointing a doctor for the purpose. So much for the fact of death. The cause of death is similarly to be certified if possible by the doctor who attended the deceased. If the deceased was unattended, or if the doctor cannot, or does not, give the requisite certificate, the registrar must report the fact to the coroner. These two certificates are to be given on prescribed forms of a distinctive colour, verifiable by means of numbered counterfoils. The practitioner making such a certificate must deliver it within 48 hours to the registrar or to the relative or other person having charge of the remains; in the latter case such relative or other person must himself deliver it to the registrar within 24 hours. Having set up this procedure by which these medical certificates are made indispensable preliminaries to the registration of death, the Bill goes on to provide that human remains are not to be disposed of except upon the authority of a registrar's death certificate or of a coroner's order. The registrar's certificate goes to the "disposal authority"—i.e., the person or body in control or management of the burial-ground, churchyard, cemetery, or authorised crematorium. The person in charge of the register kept at any such burial-ground, &c., must endorse on the certificate a signed statement of the date, place, and mode of disposal of the remains, and must send the certificate back to the registrar within 24 hours. If the registrar does not duly receive it with its endorsement, he is to notify the medical officer of health, who will inquire into the disposal of the body, and will report in writing to the registrar. The Bill provides for duplicating a lost certificate; it also prohibits the retention of human remains in a house in cases not already covered by the Public Health Acts, and it restricts and regulates the disposal of more than one body in a coffin. Of special interest to the medical profession is the proviso (which Major Molloy's Bill had contained) that no practitioner can be required to analyse the contents of a body if he states that he is unable or unwilling to do so. The proposed fee for a medical certificate is half a crown plus a mileage allowance; poor persons' fees will be paid by the guardians or overseers; and there is provision for fees where a doctor acts at the request of a coroner. The machinery thus set up is backed by penalties which are perhaps not very heavy in view of the serious malpractices which the Bill is designed to prevent. The machinery seems adequate to the purpose. If any of our readers can see any dangerous loophole in the proposals, now is the time to draw attention to it.

One other point of importance is the direction that registrars shall furnish gratis to doctors to whom forms are issued a classification of diseases. This standardisation, which doctors are to adopt as far as is practicable in their certificates, will notably improve the statistical information from which important deductions may be expected. The margin of ill-defined deaths has been reduced in recent years, but it is still too large.

Whether or Not to Abolish the Office of Coroner.

In a lecture delivered on Dec. 5th last at the Royal Institute of Public Health by Dr. A. H. Bygott, medical officer of health for West Suffolk, the abolition of coroners was boldly advocated. Dr. Bygott suggested that the medical officers of health of counties and county boroughs should be responsible for determining the cause of death by post-mortem bacteriological chemical examinations or otherwise, and that the legal departments of these local authorities, with the coöperation of the police, should be responsible for holding inquiries in public or in private as to deaths, and for the prosecution of offences in connexion therewith. It is true that the ancient office of the coroner is neither perfect nor indispensable. Critics find it not wholly suited to

[1] The Law of Coroners, THE LANCET, 1923, i., 1321.

modern conditions. Scotland has managed to get on very well without it. The only "inquest" known to Scots law is the inquiry as to deaths in prisons: for all other purposes the Fatal Accidents Acts suffice, and the procedure by which the Procurator Fiscal inquires into the cause of sudden or suspicious deaths, the results of such inquiries being transmitted to the Crown Agent in Edinburgh. Nevertheless, we believe that the Bill, which we have outlined above, stands the better chance of becoming an Act of Parliament by avoiding, as it does, any attack upon an ancient institution to which the English public somehow seems attached. The Bill has been drafted by a body representative of all interests concerned. Its proposals are so marked an advance upon the existing law that we should deprecate any alteration of its agreed terms which might jeopardise its career through Parliament.

MEDICAL RESEARCH COUNCIL.

REPORT FOR THE YEAR 1922-23.[1]

THE general plan of the annual reports of the Medical Research Council has now become as familiar as the general policy governing the expenditure of the sum, this year £130,000, annually entrusted to them for disbursement. Approximately a third of this grant-in-aid is allocated to meet the expenses of the National Institute for Medical Research at Hampstead and of the associated field laboratories at Mill Hill, and the rest of the money, apart from a modest provision for expenses, is devoted, as in previous years, to research grants for laboratory and clinical work on specific subjects carried on throughout the country and to the investigations of the Industrial Fatigue Research Board.

The fact that the list of those working under a grant or in honorary association with the activities of the Council contains 593 names and that the bodies or institutions at which correlated work is being carried out are 34 in number is sufficient evidence of the extensive nature of the aid given and of the broad field covered by the sympathetic interest of the Council. On the financial side attention is drawn to certain direct additions made to the material resources of the Council, which have made it possible to undertake a much more ambitious programme than would have been feasible had the Parliamentary grant-in-aid not been thus augmented. Important grants for particular extensions of work have been made by the Carnegie Trust of the United Kingdom (£2000), by the Dental Board of the United Kingdom (£3000), by the Miners' Welfare Fund (£500), and by the Health Committee of the League of Nations (8000 Swiss francs). Grants-in-aid of work jointly undertaken have been made by the Ministry of Health and by the Department of Scientific and Industrial Research. Contributions have been made by industrial associations to the cost of work undertaken by the Industrial Fatigue Research Board appointed by the Council. Various gifts of money have been received from individual benefactors to assist particular schemes of research work. The Council express grateful acknowledgments to the donors of these gifts, which are rightly to be regarded as gifts to the nation for the national enterprise of research. The generous allocation by the Rockefeller Foundation of the sum of $50,000 to be entrusted to the Medical Research Council for the provision of Fellowships [2] in medicine tenable in the United States during a period of three years is noted as one of the most important benefactions of the year.

Changes in the personnel of the Council itself for the year ending Sept. 30th, 1923, have been recorded in our columns as they occurred. The present constitution of the Council and of the committees called together for special investigation is set out below.

[1] London: His Majesty's Stationery Office. 1923. 3s. 6d.
[2] THE LANCET, 1923, i., 1323.

The Medical Research Council.

Viscount Goschen (Chairman), Lord Mildmay of Flete, P.C. (Treasurer), Mr. William Graham, M.P., Sir Frederick Andrewes, M.D., F.R.S., Prof. Georges Dreyer, M.D., F.R.S., Prof. T. R. Elliott, M.D., F.R.S., Sir Archibald E. Garrod, M.D., F.R.S., Dr. Henry Head, F.R.S., Prof. D. Noël Paton, M.D., F.R.S., Sir Cuthbert S. Wallace, F.R.C.S., Sir Walter M. Fletcher, M.D., F.R.S. (Secretary).

Investigation Committees for Special Subjects.

Biological Standards and the Methods of Biological Assay.—Prof. William Bulloch (chairman), Sir Frederick Andrewes, Dr. H. H. Dale, Prof. Georges Dreyer, Sir Walter Fletcher, Prof. C. J. Martin.

Bacteriology (formerly Pathological Methods).—Sir Frederick Andrewes (chairman), Prof. Bulloch, Captain S. R. Douglas (secretary), Prof. Dreyer, Dr. Paul Fildes, Prof. J. C. G. Ledingham, Dr. C. G. L. Wolf.

Anthropometric Methods and Standards.—Sir Arthur Keith (chairman), Lieut.-Colonel C. R. Sylvester-Bradeley, R.A.M.C., Dr. John Brownlee, Prof. Dreyer, Group-Captain Martin Flack, R.A.F., Dr. F. G. Hobson (secretary).

Ante-Natal and Post-Natal Problems of Child Life.—London Committee: Dr. G. F. Still (chairman), Dr. John Brownlee, Dr. Hector C. Cameron, Dr. J. S. Fairbairn, Dr. Eardley L. Holland, Dr. R. C. Jewesbury, Prof. M. S. Pembrey, Dr. O. L. V. de Wesselow (secretary). Scottish Committee: Prof. D. Noël Paton (chairman), Dr. A. K. Chalmers, Dr. Leonard Findlay, Dr. T. Y. Finlay, Dr. G. B. Fleming, Prof. J. M. Munro Kerr, Sir Leslie Mackenzie, Prof. B. P. Watson, Miss Jean Agnew (secretary).

Eclampsia (jointly with the Obstetrical and Gynæcological Section of the Royal Society of Medicine).—Dr. T. W. Eden (chairman), Mr. A. W. Bourne, Dr. Eardley L. Holland, Prof. Louise McIlroy, Dr. A. J. McNair, Dr. Everard Williams, Dr. Herbert Williamson (secretary).

Accessory Food Factors ("Vitamins") (appointed jointly with the Lister Institute of Preventive Medicine).—Prof. F. Gowland Hopkins (chairman), Miss Harriette Chick, D.Sc. (secretary), Mr. J. C. Drummond, D.Sc., Prof. Arthur Harden, Mr. W. B. Hardy, Dr. A. W. J. MacFadden, Prof. C. J. Martin, Prof. Edward Mellanby.

Quantitative Problems of Human Nutrition.—Prof. E. P. Cathcart (chairman), Dr. Major Greenwood (secretary), Dr. Leonard Hill, Dr. A. W. J. MacFadden, Sir Thomas Middleton, Prof. D. Noël Paton, Prof. T. B. Wood.

Causes of Dental Disease.—Prof. W. D. Halliburton (chairman), Dr. Norman G. Bennett, Dr. Leonard Colebrook, Mr. W. H. Dolamore, Dr. J. M. Hamill (secretary), Sir Arthur Keith, Mr. P. P. Laidlaw, Mrs. M. Mellanby, Dr. J. Howard Mummery, Dr. C. J. Thomas.

Clinical Uses of Oxygen.—Prof. T. R. Elliott (chairman), Prof. F. R. Fraser, Dr. G. H. Hunt (secretary), Prof. J. C. Meakins, Dr. E. P. Poulton.

Injuries of the Nervous System.—Dr. E. Farquhar Buzzard (chairman), Mr. W. Rowley Bristow, Dr. J. G. Greenfield, Dr. Henry Head, Dr. George Riddoch (secretary), Mr. Percy Sargent, Mr. Wilfred Trotter.

Mental Disorders.—Dr. Henry Head (chairman), Dr. Thomas Beaton (secretary), Dr. C. H. Bond, Dr. Henry Devine, Prof. G. Elliot-Smith, Sir Frederick Mott.

Tuberculosis (Subcommittee at present organised under a Committee of the Council, of which Dr. A. S. MacNalty is th Secretary).

Tuberculin.—Capt. S. R. Douglas, late I.M.S. (chairman), Mr. W. Buckley, Dr. L. S. T. Burrell, Prof. J. B. Buxton, F.R.C.V.S., Prof. Dreyer, Mr. J. Macintosh, Dr. MacNalty, Dr. H. H. Thomson, Dr. P. C. Varrier-Jones, Dr. G. T. Western, Prof. T. B. Wood.

Bacteriology of Tuberculosis.—Prof. Dreyer (chairman), Dr. R. G. Canti, Prof. S. L. Cummins, Dr. A. Stanley Griffith, Dr. A. C. Inman, Dr. MacNalty (secretary).

Salvarsan.—Sir Humphry Rolleston (chairman), Sir Frederick Andrewes, Prof. William Bulloch, Dr. F. J. H. Coutts (secretary), Dr. H. H. Dale, Dr. L. W. Harrison, Dr. J. W. McNee.

Canine Distemper.—Prof. C. J. Martin (chairman), Prof. J. B. Buxton, F.R.C.V.S., Capt. S. R. Douglas, Prof. F. Hobday, F.R.C.V.S., Mr. A. L. Thomson, D.Sc. (secretary).

Radiology.—Sir Cuthbert Wallace (chairman), Dr. C. Thurstan Holland, Dr. E. H. Kettle, Dr. Robert Knox, Sir Humphry Rolleston, Prof. Sidney Russ (secretary), Prof. S. G. Shattock.

Biological Actions of Light.—Sir William Bayliss (chairman), Mr. J. E. Barnard, Dr. H. H. Dale, Capt. S. R. Douglas, Prof. Dreyer, Sir Henry Gauvain, Dr. Leonard Hill, Dr. J. Henry Sequeira, Mr. Edgar Schuster, D.Sc. (secretary).

Cinchona Derivatives and Malaria.—Dr. H. H. Dale (chairman), Major H. W. Acton, I.M.S., Dr. Andrew Balfour, Lieut.-Colonel S. P. James, late I.M.S.

Properties of Hæmoglobin.—Mr. Joseph Barcroft (chairman), Sir William Bayliss, Dr. H. H. Dale, Dr. C. G. Douglas, Prof. C. A. Lovatt Evans, Mr. W. B. Hardy, Dr. H. Hartridge, Prof. Laurence J. Henderson (Harvard), Prof. A. V. Hill, Dr. J. H. Burn (secretary).

Physiological Actions of Alcohol.—Prof. A. R. Cushny, Dr. H. H. Dale, Dr. Major Greenwood, Sir Frederick Mott, Dr. C. S. Myers, Sir Charles Sherrington, Dr. W. C. Sullivan.

Use of Pituitary Extract in Labour (jointly with the Obstetrical and Gynæcological Section of the Royal Society of Medicine).—Dr. H. Russell Andrews (chairman), Mr. A. W. Bourne, Dr. H. H. Dale, Dr. Malcolm Donaldson (secretary), Dr. J. P. Hedley, Prof. Louise McIlroy.

"Status Lymphaticus" and Causes of Unexplained Death (jointly with the Pathological Society of Great Britain and Ireland).—Dr. G. M. Duncan, Prof. J. Shaw Dunn, Prof. F. Emrys-Roberts (secretary), Prof. E. E. Glynn, Dr. J. E.

McCartney, Prof. Matthew J. Stewart, Prof. H. M. Turnbull, Prof. G. Haswell Wilson.

Miners' Nystagmus.—Dr. J. S. Haldane (chairman), Prof. E. L. Collis, Dr. T. L. Llewellyn (secretary), Mr. G. H. Pooley.

The Industrial Fatigue Research Board and the Related Scientific Committees.—The Board: Mr. William Graham, LL.B., M.P. (chairman), Mr. R. R. Bannatyne, Mr. C. J. Bond, Mr. W. L. Hichens, Dr. C. S. Myers, Sir Joseph Petavel, Sir Charles Sherrington, Prof. E. H. Starling, Miss Mona Wilson, J.P., Mr. D. R. Wilson, M.A. (H.M. Inspector of Factories) (secretary).

Industrial Health Statistics.—Dr. Major Greenwood (chairman), Dr. John Brownlee, Prof. E. L. Collis, Mr. Alfred Henry, F.I.A., Dr. Leonard Hill, Mr. L. Isserlis, Dr. A. S. MacNalty, Mr. G. Udny Yule, Mr. T. Lewis-Faning (secretary).

Physiology of Muscular Work.—Prof. E. H. Starling (chairman), Prof. E. P. Cathcart, Prof. A. V. Hill, Prof. M. S. Pembrey, Dr. B. A. McSwiney (secretary).

Industrial Psychology.—Dr. Henry Head (chairman), Mr. F. C. Bartlett, M.A., Mr. Cyril Burt, M.A., Dr. C. S. Myers, Prof. T. H. Pear, Sir Charles Sherrington.

Legibility of Type.—Sir John Parsons (chairman), Mr. F. C. Bartlett, M.A., Dr. H. Hartridge, Mr. L. A. Legros, M.I.C.E., Mr. E. Schuster, D.Sc. (secretary).

Two Groups of Inquiries.

In the introduction to the report which is signed by Lord Goschen as chairman and Sir Walter Fletcher, F.R.S., as secretary, it is pointed out that the work of which the Council now presents an account will be found in the main to fall within two groups, not sharply distinct. On one hand there are studies which will seem to all readers to have obvious importance as pieces of medical research directly applied to the better maintenance of health or the better treatment of disease. Their urgency and value are at once obvious. On the other hand, there is no less important work of which the nature and purpose cannot so easily be appreciated, and the bearing which it has upon the improvement either of medicine or hygiene may seem more remote.

The Council finds it easy enough to get general approval for direct experimental study of particular diseases in the hope of gaining means of cure or prevention. All, again, can see the importance of finding the best physiological conditions for bodily labour of different kinds, or of studying the actions of light upon the body and the interplay of sunshine and nutritive factors in healthy growth.

It is in the latter group of studies, including perhaps the greater part of the work which the Council are supporting, that the chief difficulties of justification within short compass are found. It is not easy to explain, except at great length, the relations which studies of this kind have to the problems of practical medicine. Work upon detached points in biochemistry investigations of the laws of bacterial growth under given conditions, studies of cell life and organisation, inquiries into the behaviour of colloidal substances, all these seem often not only to the lay public but even to the practising doctor to be far divorced from useful human purposes. Neither the volume nor the value of the highly elaborate, patient, and unadvertised work which is being done in these apparently academic directions is generally realised. It goes forward, filling gaps in knowledge and forging new weapons for further work by finding new methods or instruments of research. Abundant experience is available to show that at any moment some piece of knowledge or some new laboratory method emerging from research work of this kind may bring altogether unexpected aid to the solution of some practical problem and so, whether early or late, find its fruition.

Their Inter-relations.

Effective illustration of the relations between these two intermingling groups of work is drawn from what the report describes as perhaps the most conspicuous medical event of the past year—the introduction to practical therapeutics of insulin. It is emphasised—not in order to belittle the Canadian workers, but to give their excellent work its due credit as a scientific and not a chance discovery—that this sort of "discovery" is the end-point of a long series of scientific steps each of which was as truly a "discovery" and each of which was accomplished by men exceptionally gifted. Some at least of these efforts made on these lines in the past were probably abortive for want of parallel progress in the technical methods available for rapid estimation of small quantities of sugar in the blood. The brilliant result of a bravely renewed attack upon a problem which many of their predecessors had abandoned as almost hopeless by Dr. F. G. Banting, Mr. C. H. Best, Prof. J. R. R. MacLeod, and Dr. J. B. Collip, of Toronto University, is now a matter of world history. We rejoice that the report mentions Dr. Collip's name in this connexion, for it is apt to be forgotten that while Banting put out of action the trypsin secreted by the main pancreatic glands by a preliminary ligature of the ducts, it was Collip who devised a means of achieving a similar result on a large scale by the use of alcohol.

The Application of Funds to Promote Medical Progress.

The Council notes that there are signs in some directions of a growing tendency to yield to the temptation to give or to ask money not for the steady cultivation of knowledge along the natural lines of growth, but for the attempted purchase of practical fruitfulness before its time. Stimulated by notable and obvious achievements like the production of diphtheria antitoxin, preventive inoculation against typhoid, the defence against scurvy and rickets through dietetic knowledge, the control of body function by pituitary extract or by insulin, the public, and indeed some parts of the medical profession, are tempted to think that money collected directly for the discovery of similar practical boons, or that rewards offered to particular discoverers, will aid progress, instead of learning the lesson of experience and seeking the due provision of money for disinterested scientific work and the due support of the ablest scientific men to do it. As the Council said in its annual report four years ago, and now repeats, power to prevent or cure a disease must not be expected to come by sudden discovery, nor often as the result of a special campaign, however vigorously prosecuted. Rapid gains, often unforeseen and in unexpected directions, may be confidently expected, however, so long as the area of accurate knowledge is maintained in its growth; we cannot foretell the flow of water here and there in the irrigating channels along a shore, but we know that the flow must certainly follow whenever the tide raises the general level of the waters.

Animal Experiments.

The Council draws attention from another point of view to the production and successful use of insulin in the treatment of diabetes. The functions of the pancreas in the control of diabetes were first elucidated by the study of diabetes artificially inflicted upon dogs. At every subsequent stage in progress animal experiment has been necessary, and even now every batch of insulin must be tested upon animals for the assessment of its potency. The great service rendered by animals to mankind, of which this is only one example, must be counted as a higher service than that which is given by animals to provide the clothing, the food, or the amusements of mankind. It is plainly right that this high service should be gratefully recognised and openly acknowledged by the whole community that takes advantage of it. In their last annual report the Council referred at some length to their hopes for a better organisation in this country of the study of animal diseases, which, quite apart from the benefits to be expected from it for agriculture, and, through the veterinary profession, for the benefit of all domesticated animals, must bring invaluable help to medicine. The veterinary and medical sciences are not different sciences, but occupy the same field of pathology, which both in theory and practice must always be a comparative pathology. On this account the Council cordially welcome the establishment of a chair and a school of animal pathology in the University of Cambridge.

The National Institute of Medical Research.

The 17 pages devoted to admirably condensed summaries of the type of investigations being undertaken in the six departments of the Institute are well worth careful study. It has fallen to the Department

of Biochemistry and Pharmacology, under the direction of Dr. H. H. Dale, F.R.S., to undertake the arduous task of organising the preliminary trials, methods of preparation and standardisation of insulin, and Dr. H. W. Dudley is now engaged in investigating its chemistry. Dr. J. H. Burn has observed an interesting antagonism between extracts of the posterior lobe of the pituitary body and insulin in their effects on the blood-sugar. It is interesting to learn that the conclusions reached by Dr. Dale and Dr. H. King, working in association with Dr. C. F. Hadfield, on the anæsthetic action of pure ether (THE LANCET, March 3rd, 1923) have been completely confirmed by the concurrent and independent observations of Prof. Storm van Leeuwen and his colleagues at the University of Leiden, who find that ether purified by crystallisation with organic substances retains its full anæsthetic potency. In the Department of Experimental Pathology, Bacteriology, and Protistology, Captain S. R. Douglas, F.R.S., the director, has undertaken experimental work on the nature and actions of diaplyte vaccine, introduced by Prof. G. Dreyer, and during the early part of the year continued his investigations into rat leprosy, this work having been more recently undertaken by Dr. P. P. Laidlaw, with encouraging results. Dr. W. E. Gye has developed his work with Dr. W. J. Purdy on the action of colloidal silica administered to animals, and is now devoting most of his time to the study of filter-passing organisms, and has cultivated such an organism from chicken sarcomas. Dr. Laidlaw has studied the nutrient factors which stimulate the growth of bacteria, Dr. Percival Hartley has been mainly occupied in the preparation of a standard diphtheria antitoxin, while Mr. Clifford Dobell, F.R.S., has continued his work on the improvement of technical methods for the investigation of very minute organisms, and his studies of the amœba, coccidia, and spirochætes which infect man. In the Department of Applied Physiology, Dr. Leonard Hill, F.R.S., the director, Dr. J. Argyll Campbell, and other workers have continued their studies of the chemical exchanges of the body and their efficiency, undertaken with special reference to open-air treatment of disease and to the hygiene of physical labour. Dr. Major Greenwood (Ministry of Health) has received accommodation in the Institute for statistical inquiries, and has coöperated with the staff in various ways. The Council records its continued indebtedness to Mr. J. E. Barnard for his honorary services as director of the Department of Applied Optics. For better study of the biological actions of light a photometric method of measuring the relative energies of ultra-violet radiations has been adopted. A brief note of the work of the Statistical Department (Dr. John Brownlee, director, and Dr. Matthew Young), and of the Library and Publications Department concludes this section of the report.

Biological Standards: Research Work in Clinical Units.

The third section of the report is devoted to the determination of biological standards and the methods of biological assay and measurement. This includes a description of the work done upon biological standards at the National Institute for Medical Research, an account of the national collection of type cultures, the production of standard diagnostic sera and cultures, a discussion of international serological standards, and of anthropometric methods and standards of medical measurement. The Council's Department of Clinical Research is housed at University College Hospital, London, under the direction of Sir Thomas Lewis, F.R.S., and a long list of publications testify to the excellent original work being carried out by the director, Dr. A. N. Drury, Dr. R. T. Grant, Dr. C. C. Iliescu, and the large number of voluntary workers from all parts of the world who have considered it a privilege to work in the department. These include Dr. T. F. Cotton, Dr. A. Sebastiani (of Rome), Dr. W. Horsfall (of Sydney), Dr. C. W. Munley (of Portland, Oregon), Dr. H. L. Blumgart (of Boston), Dr. J. J. Sumbal (of Bratislava), and Dr. F. Smith (of Chicago). The research work being done under grants from the Council at various other London, provincial, and Scottish hospitals is also indicated. Mostly this work is again referred to in more detail in the next section of the report entitled

Research in Specific Subjects.

We shall have to return on innumerable occasions to the consideration of the mass of work described as in progress throughout the country. It must suffice here to give a list of the headings into which it is classified and to recommend this section of the report for special study. The headings include: Problems of Child Life—Rickets, Accessory Food Factors ("Vitamins")—Studies of Deficiency Diseases in Central Europe, Human Nutrition, Dental Disease, Disorders of the Cardio-vascular System, Exophthalmic Goitre (Graves's Disease), Disorders of the Respiratory System, Disorders of the Excretory System, Disorders of the Nervous System, Mental Disorders, Tuberculosis, Studies of the Streptococcus and Pneumococcus Group, Diphtheria, Venereal Diseases, Filtrable Viruses—Canine Distemper, Diabetes and Insulin Treatment, Arthritis, Malignant Disease, Radiology and Radiotherapy, the Biochemical Actions of Light, General Biochemical Researches, General Physiological and Pathological Researches, Experimental Epidemiology, Metazoan Parasitology.

Conclusion.

After a section devoted to industrial medicine and industrial fatigue a concluding paragraph of the report pays a special tribute to the invaluable aid given to the Council's work by the numerous scientific men who have been willing to give their time to serving on committees in charge of particular investigations. The list of investigation committees set out above is the clearest proof that there are few subjects of topical and urgent medical interest which are not receiving the earnest attention of the Medical Research Council. It is not possible to do justice in any summary of so pithy and condensed a report as this one. We can only hope to indicate its scope.

VIENNA.

(FROM OUR OWN CORRESPONDENT.)

The New Medical Bill.

THE representatives of the medical profession have now been informed of the leading principles underlying the proposed Medical Act which the Government is about to lay before the National Assembly. That the Medical Council was not even invited to coöperate in drafting the principal clauses of this Bill was considered, at the time, as an insult to the profession, and now it is anticipated that the contents of the Bill will cause even wider dissatisfaction among doctors. The promises made to the profession within the last three years would appear to have been forgotten, and the desire to control the rights and duties of doctors by non-medical men is manifest. Thus, for instance, a disciplinary court consisting of four doctors and five lawyers or officials is entrusted with the control of professional infringements of law, but of these four medical men two are to be chosen from State officers of health. This court would have power to strike the name of a culprit off the Medical Register for a period of one to six years. All minor offences would go before the Medical Council, but all serious cases would be judged by this largely non-medical court. A chapter deals with professional secrecy. Under the new Act the doctor would be bound to disclose to the judge in a court of law any details about his patients that might be demanded, and important "personal or public interests" would justify a breach of professional secrecy! At present a doctor is not bound to take over the treatment of a patient except in case of urgent need—in this Bill

no doctor may refuse professional help unless absolutely unable to do so. As regards the medical curriculum, the old desideratum of the profession—viz., that a compulsory "hospital year" be added to the normal five and a half years' course of training of the medical student will not be realised, but a clause states, that in certain conditions this additional year might be stipulated "if found advisable." In a word, the Bill violates the all-important principle that affairs pertaining to the welfare of a certain profession be controlled by members of that particular profession only. It is not to be wondered at that the articles and clauses as stipulated in the suggested Act are far from finding the approval of those most concerned. A strenuous fight against such bureaucratic methods is natural, and the profession is once more firmly united in the struggle for self-determination.

Experimental Principles in the Treatment of Cardiac Insufficiency.

At a recent meeting of the Vienna Biological Society Prof. Wiechowsky read an interesting paper on the above subject, in which he stated that the modern researcher decides the possible remedial efficacy of various substances from the analysis of their experimental effects on the organs. Information thus obtained is more reliable than the knowledge gained by general experience and bedside indications alone, but laboratory findings must be controlled by clinical observations. He reported chiefly on the results of his experiments conducted solely on the frog's heart with a view to ascertaining the correct use of cardiac analeptics. The hearts were completely anæsthetised with chloroform and other toxic drugs, and the substances used as analeptics were: caffeine, adrenalin, digitalis, camphor, calcium salts, and physostigmine. He finds that caffeine can be used universally as an analeptic for all conditions of cardiac insufficiency. The derivatives of digitalis are useful only where failure of compensation through organic valvular disease has taken place. Camphor increases the minute-volume of blood only in cases of fibrillation (extra-systole). Its action in this respect is identical with that of strychnine or quinine, and has an equally weakening effect on the muscular action. Therefore it should be combined with caffeine or digitalis. Adrenalin throws extra work on the cardiac muscles by increasing the pressure. Therefore it should not be used alone in cardiac insufficiency; its chief indication is collapse due to paralysis of the central vaso-motor centres, the heart being otherwise intact. The cardiac analeptics should be injected intracardially in all instances of severe insufficiency or even in cases of complete standstill of the heart. Even after a few minutes of absolute cessation, heart-beats may be recommenced by this procedure. Before starting a chloroform narcosis, caffeine or theobromine should be injected subcutaneously so as to prevent a syncope.

Justification of Artificial Abortion: A Medical Protest against Present Jurisdiction.

In my letter of Dec. 15th, 1923, I called attention to the alarming increase of criminal abortion in Austria as instanced by Prof. Latzko, and referred to a growing body of opinion which was endeavouring to legalise artificial abortion before the third month of pregnancy. The law, however, maintains a very uncompromising attitude of unremitting severity towards any such procedure. Several months ago, as I mentioned in a previous letter (THE LANCET, June 23rd, 1923) the Supreme Public Prosecutor issued an order to all medical corporations, boards of health, and hospitals, demanding that in every instance of abortion where an external cause might be suspected, a report should be made to the police by the doctor or midwife. This attempt to tamper with professional secrecy was absolutely repudiated by the profession, and it may be stated that neither in hospitals nor in private practice were any questions asked which might have caused trouble to the woman. But quite recently the High Court took opportunity to commit two eminent members of the Vienna medical world for trial because the one had advised the inducement of an artificial abortion, and the other had operated on the woman in question. Both were sentenced to three months' imprisonment on the testimony of the forensic expert, who stated that from the data obtained from the patient after several months and from the notes of the case-history in the private cottage hospital, he had come to the conclusion that the abortion was not a matter of necessity. The point is that while both men were fully qualified practitioners of some standing, the expert was a forensic pathologist, and as such no clinician. The incident caused a violent outburst of indignation in the profession; in mass meetings and in the press the present rôle of the forensic expert was severely criticised. In a resolution passed by the Medical Council and the meetings of the Specialists' Union, the Government was informed, in particular the Ministry of Justice, that the profession refused to be subjected to antiquated methods of jurisdiction. Medicine had made such enormous strides in the last 30 years that it was absolutely necessary to obtain the opinion of the clinician who was abreast with modern practical medicine, whenever medical problems were concerned. The pathologist, on the other hand, however high might be his standing in his own branch, lacked the experience obtainable only at the bedside of the patient. In judging the pros and cons of a case of abortion the Medical Council thought it "of paramount importance that a clinical expert be called upon to advise the judge and the court." This resolution also found a most hearty support in the public lay press. The reactionary turn taken lately by the bureaucracy and jurisdiction in this country is being much resented and commented upon by all sections of the community.

The Services.

ROYAL NAVAL MEDICAL SERVICE.

THE following Surg. Comdrs. are placed on the ret. list with the rank of Surg. Capt.: S. Roach, J. Stoddart, R. S. Osborne, H. P. Turnbull, A. Woollcombe, and K. H. Jones.

Surg. Capt. R. A. Ross is placed on the ret. list with the rank of Surg. Rear-Admiral.

W. G. C. Fitzpatrick to be Surg. Lt.

ROYAL ARMY MEDICAL CORPS.

Temp. Capt. T. Bourne-Price relinquishes his commn. and retains the rank of Capt.

REGULAR RESERVE OF OFFICERS.

Lt.-Col. J. F. W. Sandison, late R.A.M.C., Militia, to be Lt.-Col.

TERRITORIAL ARMY.

Sanitary Companies.—Capt. J. Ogilvie resigns his commn. and retains the rank of Capt.

Supernumerary for Service with the O.T.C.—Maj. (Prov.) C. H. Carlton, from General List, to be Maj. (Prov.) for service with the London University Contingent, O.T.C.

TERRITORIAL DECORATIONS.

The King has conferred the Territorial Decoration upon the undermentioned officers: Lt.-Cols. T. A. Barron, D. J. Graham, J. M. Gover, W. Lister, G. S. A. Ranking (ret)., and D. G. Rice-Oxley; Majs. A. C. Goodwin, D. V. Haig, A. Ayre-Smith, and G. E. J. A. Robinson; and Capt. (Bt.-Maj.) C. W. Wirgman (ret.).

ANTI-OPIUM PROPAGANDA IN CHINA.—Dr. Chuan, formerly director of the Chinese Army Medical College for six years, has been appointed secretary of the Opium Committee of the National Christian Council of China, which has now moved from Shanghai to Peking, so as to be able the more effectively to work with Dr. W. H. G. Aspland, of the International Anti-Opium Association. Dr. Chuan graduated at Peiyang Medical College and afterwards studied at Johns Hopkins and Harvard. For a short time in 1922 he was Vice-Minister for Education, and last year he became director of the Central Sanitary Department, Peking. He expects to be chiefly engaged in providing anti-opium literature in Chinese, particularly for the Chinese Church.

THE CAPITATION FEE FOR INSURANCE PRACTICE.

THE OPENING SESSIONS OF THE COURT OF INQUIRY.

THE Court of Inquiry appointed by the Minister of Health to determine what should be the amount of capitation fee payable to insurance practitioners held its first sitting on Friday, Jan. 4th, at the Ministry of Health. The chairman of the Court is Mr. T. R. Hughes, K.C., the other two members being Mr. F. C. Goodenough and Sir Gilbert Garnsey, K.B.E. The minute of appointment directs the Court

"to enquire and report to His Majesty's Government what should be the amount of the capitation fee (per insured person per annum) on the basis of which the Central Practitioners Fund under Article 19 of the National Health Insurance (Medical Benefit) Regulations, 1924, should be calculated as from the 1st January, 1924, so as to afford adequate remuneration for the time and service to be given by general practitioners under the conditions set out in those Regulations, in connection with the medical attendance and treatment of insured persons, due regard being had to the service in fact rendered under the Regulations hitherto in force. This capitation fee is not to include any payment in respect of the supply of drugs and appliances (such payments being made out of the Drug Fund under Article 24 of the Regulations), nor any payments to meet the special conditions of practice in rural and semi-rural areas."

FRIDAY, JAN. 4TH.

In opening the proceedings the Chairman said the Court had before them the printed case submitted by the Insurance Acts Committee of the British Medical Association; the printed case of the Ministry of Health and the Secretary for Scotland; and a memorandum by the Medical Practitioners' Union. The Emergency Committee of the Approved Societies' Association had now decided to submit their views to the Court.

The Attitude of the Approved Societies.

Dr. Alfred Cox, medical secretary to the British Medical Association, entered a protest against the action of the approved societies who, after having stated that they did not intend to take part in the proceedings, had now, after the evidence of his association and of the other parties had been put in, changed their minds. It appeared that their action would delay the proceedings and postpone the report of the Court. The societies were "trying to make the best of both worlds"; he hoped they would come before the Court, but they should do so on the same terms as the other parties.

Mr. Scott, assistant secretary to the Emergency Committee of the Approved Societies' Association, stated that he was present with a watching brief to listen to the proceedings on behalf of the Emergency Committee. The approved societies proposed to give evidence at the request of the Ministry, but they had no desire to be represented at the inquiry that day. Their case would not be ready before the 20th.

The Chairman said that there seemed to be a misapprehension. The Ministry had not requested the societies to give evidence, but had intimated that they would be glad if the societies thought it desirable to do so. The representatives of approved societies should understand that they were at liberty to take part in the inquiry, but the inquiry could not be delayed until their case was put in. He hoped that the societies would prepare their case before the 20th.

Dr. Cox drew attention to the fact that Mr. Percy Rockliff, secretary of the Joint Committee of Approved Societies, was reported that morning in the press to have given as a reason for the decision of the societies to take part in the proceedings, the changed personnel of the Court. Apparently they did not think the Court was impartial until Sir Josiah Stamp was dropped out. His Association believed that the Minister of the Crown would not appoint a Court which was not impartial, and he felt it was due to the decencies of public life that a protest should be made.

The Chairman said that the matter mainly affected the Tribunal, which would be quite indifferent to it.

The Case for the Doctors.

Dr. H. B. Brackenbury, chairman of the Insurance Acts Committee of the British Medical Association, then gave evidence in amplification of the Association's printed case. He said that they were there in no partisan spirit; they desired to do all that they could to assist the Court of Inquiry. There were certain important points of principle which he would like to emphasise at the outset. (1) The medical profession as such was deserving of relatively high remuneration; all those indications which would justify a relatively high rate of pay were to be found in the medical profession. (2) Insurance doctors should, so far as possible, be placed on the same footing, financially, as the rest of the profession, otherwise the best men would be drawn to other branches of professional work. (3) The capitation fee was uniform throughout the whole service; therefore regard must be had to the higher as well as to the lower conditions prevailing in that service. (4) It was necessary that such a rate of payment should be given as would not only attract but also retain the services of first-class doctors.

The conditions of medical practice were to-day very different from those existing 10 or 12 years ago. Doctors had now to devote a great deal more time in investigating cases of illness. The general practitioner treatment of to-day to which the insured person is entitled was something larger than was in their minds when the National Insurance Act first came into operation. The doctors had themselves on several occasions suggested the enlargement and extension of the service, and it was the desire of the medical profession that a very complete general practitioner service should be available for the insured population. They must, however, have regard to the increase in the doctor's work consequent on the advance of medical science on the one hand and on the extended scope of general practitioner treatment on the other.

As regards the statistical side of their case, the figures had been prepared by Prof. Bowley, who had explored the subject as an independent statistician. The figures had been in no way modified by the Association. The conclusion drawn from these figures was as follows: Assuming that they applied all the economic principles which had been learned since the war and that they accepted the same relative standard of conduct, they would require, in order to maintain the 1913 standard of living, a capitation fee of something over 11*s.* as compared with the 7*s.* 3*d.* of 1913, and even then the relative saving capacity of the doctor would be reduced from £100 to £42—an amount barely sufficient to cover insurance premiums.

The Ministry had suggested a comparison with the fluctuations in the bonus paid to civil servants, but in their opinion this was not a satisfactory way of apprising relative values. It was a doubly doubtful analogy, for the alterations in the Civil Service bonus was in itself a doubtful method of deciding relative values, and to apply this doubtful test to the materially different conditions of the medical profession rendered the result still more doubtful. The Ministry had applied the Civil Service bonus figures to the maximum instead of to the average of the doctor's remuneration. Moreover, at no time had the increase in the insurance doctor's remuneration been adjusted to anything like the height of the Civil Service bonus. Apart from his pay, the civil servant received pension, holiday, and other advantages which had no counterpart in the doctor's practice. The only true analogy would be obtained if the value of these special benefits were deducted before the bonus curve were planned, their value being subsequently added to the resultant figure for the doctor's remuneration. With reference to the cost of carrying on a practice, it was clear that a reduction in cost of materials did not carry with it a

reduction of practice expenses in the same proportion. Considering only non-dispensing practices, he considered that the average practice expenses were about 25 per cent. of gross income.

There were certain validity tests which could be applied to the capitation fee for which they asked. The first was the standard of fees paid to a doctor in his private practice. Omitting the exceptional practices where the patients had very small means, the private fees normally received for similar services were fairly comparable with the capitation fee of from 10*s.* 4*d.* to 10*s.* 9*d.*, which they claimed. It must be remembered that in private practice a doctor receives extra payment for many services—e.g., night visits, operations, administration of anæsthetics, which are included in his insurance contract. Another test was the contract service outside the National Insurance Acts. In this class of work there was almost invariably a restricted service, with extra fees for special services, and frequently members were accepted only after medical examination; yet they found that, with few exceptions, the club doctors received a higher capitation fee than the insurance doctor.

There was the further suggested test of the "Time Rate Equivalent." In his opinion they were, on this matter, still groping after the full facts; he thought that both the Ministry and the profession had been wrong in the time equivalence tests which they had sought to apply in 1920. It seemed to him impossible to apply the time factor to the profession. The doctor's work involved constant application and absorption. He had to apply the whole of his professional knowledge to what he did. They strongly objected to the suggestion that it could be said that certain services required only a certain number of hours out of the 24, and that the payment should be based on such calculations. In the interests of national health it was necessary to allow a measure of spare time; if all doctors were kept fully employed for periods of normal illness there would be no reserve to meet times of epidemic. The Ministry suggested that only one-half of a doctor's time would be occupied in looking after 2000 patients. This involved the conclusion that 8000 doctors fully occupied would be sufficient to carry on the whole general practice of the country. In fact, the number of doctors was two and a half to three times in excess of that figure, and it was absurd to suggest that they were all surplus to requirements.

In conclusion, Dr. Brackenbury said that the amount which the capitation fee would bring to the individual doctor must represent the translation into terms of income of all the services which the doctor was required to render under his agreement with the Insurance Committee. In deciding that amount it was necessary to have regard to the present cost of living, to the extensive character of the services which were involved, and to the need for maintaining a high standard of professional efficiency in the National Insurance Service.

In reply to questions addressed by members of the Court, Dr. Brackenbury stated that the average private fees might be taken as 3*s.* 6*d.* for a consultation and 5*s.* for a visit; sometimes they were 2*s.* 6*d.* and 3*s.* 6*d.* respectively, and frequently they were higher than the average. In any case it was customary to charge special fees for some services such as fractures or dislocations, which were included under the normal insurance agreement. A doctor with 2000 patients on his list could not do justice to his patients unless he employed some clerical assistance. It was difficult to give any average figure of the number of patients a doctor could visit in the course of a day; it depended largely on the nature of the practice. He agreed that a doctor should be able to give adequate treatment to 25 patients a day in an average practice.

Figures Supporting the Doctors' Claims.

Dr. Cox presented figures in support of the doctors' case. He said that the British Medical Association has experienced great difficulty in obtaining statistics from its members; it had to extract them by something approaching violence. Reducing private fees to a capitation fee equivalent, and assuming 3·8 services per insured person per annum, the returns from 13 areas showed that in only two cases was the fee below 10*s.* 6*d.*; the maximum was 14*s.* 9*d.*, and the minimum 8*s.* 7*d.* Regarding contract rates outside the insurance scheme, the figures for 40 public medical services showed that in 18 an annual fee of 13*s.* was charged for treatment and medicine; in the remaining 22 the fee varied from 20*s.* to 6*s.* 6*d.*, the latter figure referring to patients with an income limit of 21*s.* a week. There was usually an entrance fee, and special fees were charged for vaccinations, expensive medicines, and special services like fractures, dislocations, operations with anæsthetic, miscarriages, &c. As regards private contract arrangements made by individual doctors, the income limit was often £150, the patients were selected, and the services restricted. The fees varied considerably. Out of 55 cases from all parts of the country, the adult capitation rate varied from 7*s.* to 18*s.*; only seven were under 10*s.* In 13 contract arrangements made exclusively for the police, the rate varied from 11*s.* to 20*s.* The contract rate in respect of Post Office employees had been varied to accord with the National Insurance capitation rate, and was 11*s.* 6*d.* including medicines. For the colliery districts, where contract practice was common, the weekly rate worked out at a capitation fee of 9*s.* 7*d.* in Scotland and 7*s.* 8*d.* in England.

Points from Statistics.

Prof. A. L. Bowley explained some points arising out of the statistical evidence of the doctors' case. In working out the figures for the 1920 arbitration he had taken account of the special circumstances existing—for example, the scarcity of certain food-supplies, the high prices, and the inelasticity of professional incomes, and he had accordingly assumed a considerable economy in the individual doctor's budget. In 1923 there was not the same need for economy, in the national sense, and the reasons for writing down the cost of living in 1920 were no longer all applicable. This explained why the 1920 and 1923 computations did not fit closely into each other. The broad result of his calculations was that the doctor's expenses for 1923 were nearly equal to that for 1920.

Mr. M. L. Gwyer, solicitor to the Ministry of Health, suggested that it would be helpful if figures could be prepared for 1920 and 1923 computed on the same basis.

Support from the Medical Practitioners' Union.

Dr. Gordon R. Ward made a statement in support of the case submitted on behalf of the Medical Practitioners' Union. He said that in the opinion of his union it was most important that regard should be had to the quality as well as to the quantity of medical practitioners engaged in insurance practice. There had been a falling-off in doctors' incomes derived from their private practices; this was due to a variety of causes, such as the financial stringency of the middle classes, the raising to £250 of the income limit under the Insurance Acts, the increase of clinics and of hospital treatment, and the general improvement in public health. He suggested that it was a time when the remuneration from insurance practice should be increased rather than reduced. A higher rate of remuneration was also demanded by the increased range and complexity of the services required from insurance practitioners. As instances of the additional work and responsibility which the insurance doctor had to shoulder, Dr. Ward noted the increased services to hospital patients, prophylactic treatment, the treatment of allergic disease, insulin, and psychotherapy. Further, there were the grave and burdensome conditions under which the insurance doctors were obliged to accept service, including an elaborate penal code. In reply to the Chairman, Dr. Ward stated that in his opinion the average daily number of visits paid by a doctor was about 12; for his own district (Sevenoaks) it was 11·5–14.

The Case for the Ministry of Health.

Mr. Gwyer, in presenting the case on behalf of the Ministry and the Secretary for Scotland, stated that the Department, too, had approached the question impartially. They had not sought to find the cheapest rate for which they could get an insurance medical service. The capitation fee put forward by the Ministry represented, in their opinion, one for which a good average service was likely to be obtained. The Minister proposed to offer no evidence as to the quality of the service which had been given in the past. While reserving the right to call rebutting evidence at a later stage, if necessary, they accepted the past service as efficient, although, perhaps, capable of improvement.

A strictly scientific method of determining the doctors' rate of payment was probably impossible to find; one could only try several methods, and if approximately similar results were obtained those results were probably correct. All the Ministry's tests had resulted in a figure of approximately 8*s.* 6*d.* While the Ministry did not suggest that the Civil Service bonus figures were entirely comparable with the doctors' remuneration, they regarded them as being reasonably comparable for the purpose of showing the relative increase and decrease; the Ministry had used these figures only as an analogous ratio of reduction. With reference to the Time-rate Equivalent, the Ministry had arrived at the conclusion that the value of the insurance work of a doctor may be regarded as being roughly one-half of his practice. This did not mean that he necessarily earned as much from private practice as from insurance practice, but the Ministry suggested that it was a reasonable assumption that he could do so if other patients were available and were ready to go to him. The department had undertaken a careful examination of the advertisements which had appeared in certain medical papers offering medical practices for sale, and it had been found that there was a singular relation between the number of insured persons on the doctor's list and the income stated to be derived from the practice. In a large number of cases it was £1 per insurance patient; sometimes it was 30*s.* or even £2. The minimum fee in many cases was stated to be 2*s.* 6*d.*

At this stage the Court adjourned, the Chairman announcing that the Court would sit on the 21st to consider the evidence of the approved societies.

MONDAY, JAN. 7TH.

When the Court reassembled on the 7th, Sir Thomas Neill stated that the approved societies would prepare their case by the 19th. Mr. Gwyer, continuing the presentation of the Ministry's case, stated that approximately 50 per cent. of insurance doctors had under 900 insured persons on their list. Reverting to the Time-rate Equivalent, it must be understood that the capitation fee was a method of remuneration for part-time only; no doctor was occupied only with insurance practice. For the purpose of converting the fee into its time equivalent it was, however, necessary to consider how much of the doctor's time was taken up by a given amount of insurance work. Although this could not be gauged with scientific accuracy, the Ministry's calculations had been made with great care from actual records kept by doctors whose panel patients totalled three-quarters of a million. If it were not possible for a doctor to give adequate treatment to more than 25 patients a day, as had been suggested, it was difficult to understand the figures which appeared in the sale advertisements of practices where the number of insurance patients alone was not infrequently stated to be 3000, while the gross income of the practices was in all cases at least double the income derived from panel patients. A capitation fee of 8*s.* 6*d.* represented a fee of 2*s.* 5*d.* per service rendered; taking into account that this excluded the cost of medicines, cost of collection, or loss through bad debts it was practically equivalent to a fee of 3*s.* in private practice. The doctors' case made a comparison between the figures for 1913, 1920, and 1923, but it was not stated that the main increase in the doctors' work and responsibility since 1913 had resulted from the 1920 Regulations, and had, therefore, existed at the time of the 1920 arbitration, when the profession had agreed to the reduced capitation fee. The range of service had, since 1920, only been extended as regards the administration of anæsthetics. As regards the references in the doctors' case to the increase in the forms of certificate, two of the additional certificates had been asked for by the doctors themselves as tending to relieve them of work, and for a third they might demand extra payment.

The Time-rate Equivalent.

Dr. J. Smith Whitaker, a senior medical officer to the Ministry, gave evidence as to the time-rate equivalent. This method, he said, was first mentioned in a document issued in October, 1919, by the British Medical Association, and in 1920 a considerable part of the doctors' argument had proceeded on that basis. The Ministry had felt that it was necessary to relate the capitation rate to something which was commonly understood, and the test of time-rate payment was of this nature. The Department did not concern themselves with what the doctor might do in the time not devoted to insurance practice, but they were entitled to calculate the time occupied by the work for which the doctor received payment out of the Insurance Funds. It was said that the method of investigating the time equivalent and the accuracy of the records on which the calculations were based were imperfect; but very great care had been taken in this matter. The Regional Medical Officers had received very full instructions, and only the statistics of those doctors who were known to keep careful records had been taken; even so, the Ministry had rejected any records which showed an exceptionally low rate of attendances. The records were examined for towns and practices of all sizes, and, before coming to their final decision, the Ministry had the assistance of the Government Actuary's Department. Having regard to the fact that this investigation had established the figure of 3·5 services per insured person per annum, he submitted that the Court should not accept a higher figure unless it could be substantiated by equal evidence. Statistics showed that 50 per cent. of the insured population pass through the doctors' hands every year, but only from 25 per cent. to 30 per cent. of these made sickness benefit claims; in other words, only one-half of the patients attending a doctor needed certificates. The figures in the Manchester and Salford districts (where the insurance doctors were paid on an attendance basis) showed that only 0·5 per cent.—1 in 200—of the services rendered were "special" services, such as night visits, minor operations, fractures, or dislocations. He considered that a doctor could do all the work arising in connexion with an insurance list of 2000 and yet give an equal amount of time to other professional work without overworking himself. He would regard a doctor's whole time as 2400 hours a year—i.e., eight hours on 300 days a year. Two thousand patients would require about 24 services a working day; of these services eight would be visits and 16 would be consultations. A capitation fee of 7*s.* 9*d.* was at the rate of a net income in the neighbourhood of £1200 for whole-time work, a fee of 8*s.* 6*d.* would give £1330, while 10*s.* 6*d.* would give a net income of £1640.

In reply to questions by the Chairman, Dr. Smith Whitaker said that in his opinion about ten patients could be seen at the surgery in the course of an hour and in urban areas three or four visits an hour could be paid. He thought that, broadly speaking, 48 services a day, giving ten minutes for each, was a fair estimate, and that £665 represented a fair remuneration for half of the doctor's time. It was true that the Manchester and Salford figures showed 4·35 services per patient per annum, but it must be remembered that the remuneration was there reckoned on an attendance basis.

The Chairman expressed doubt whether 10 consultations per hour, or 48 services a day, allowed sufficient time to the doctor.

Dr. H. J. Neilson, a Divisional Medical Officer of the Ministry, gave evidence as to his experience of insurance practice in Nottingham from 1913 to 1915. He had worked with a partner and four assistants and the total panel of insurance patients numbered from 7000 to 8000; in addition he did more private work than insurance work. His experience was that even a doctor working comparatively slowly could manage eight visits and 16 consultations in half his time. Only about 25 per cent. of the cases treated were new cases. He worked about seven hours a day.

Dr. Brackenbury said that, on the witness's statement, he did not see why six doctors should have been necessary to deal with from 7000 to 8000 insured persons.

In reply to Dr. Ward, the witness admitted, amidst laughter, that he had been known by the nickname of "The Scotch Express."

Dr. B. A. Richmond, Regional Medical Officer of the Ministry, gave similar evidence regarding his practice in Bermondsey from 1900 to 1914. He worked the practice with five partners and there was a list of between 7000 and 8000 insurance patients, in addition to an extensive private practice. In the course of nine and a half hours' work, it had been possible for one doctor to see 40 patients at the surgery and to pay 20 visits; of these about 25 surgery attendances and five visits would relate to insured persons.

Dr. Brackenbury, having elicited the fact that 200 maternity cases were also dealt with in the course of the year, felt a difficulty in understanding how they were fitted in with the other services described by the witness, and he wondered what would happen in such a practice in times of epidemic or other stress.

Statistical Side of the Ministry's Case.

Mr. E. J. Strohmenger, C.B., Accountant-General to the Ministry, in giving evidence on the statistical side of the Ministry's case, said that, had a deduction been made, as was suggested, in respect of the pensions and other rights enjoyed by Civil servants, it would, as regards the material income limits, have made a difference of only ¾*d.* on the capitation fee. He criticised the conclusions drawn by the Insurance Acts Committee from Prof. Bowley's figures. They put the doctor in a relatively much more favourable position in 1924 than in 1920. Taking only two items, clothes and personal expenses, while Prof. Bowley showed the same percentage increase over 1914 for both years, he suggested that the cost of clothes had decreased 30 per cent. and personal expenses had decreased by 15 per cent. since 1920. He could not agree to the conclusion that, in spite of the admitted fall in prices, the cost of living for the doctor had remained practically the same. Even the moderate amendments which he suggested to Prof. Bowley's figures showed a fall approaching 20 per cent. in the expenses for 1923—a fall closely approaching that in the Civil Service bonus scale. If a capitation fee of 11*s.* was fair in 1920, then the figure for 1923 should certainly be no higher than 8*s.* 6*d.*

Sir Gilbert Garnsey stated that the figures for 1920 and 1923 in the doctors' case had now been worked out on the same basis, with the result that 1923 showed a fall of 36 points instead of 7 points as in the figures shown in the doctors' case.

Disciplinary Action.

Mr. L. G. Brock, assistant secretary to the Ministry, said that it had been suggested that the disciplinary control exercised by the Ministry over insurance doctors was so arduous that it should be taken into account in determining the appropriate capitation fee. In fact, during the past four years only five doctors had been removed from the Medical List by the Minister; three others had been allowed to resign; and of three other doctors threatened with removal two had been removed from the Medical Register by the General Medical Council, and one had died; 14 representations for the removal of a doctor had not been upheld; while in five cases a pecuniary penalty only had been inflicted. During the same period, out of 1331 cases dealt with by the Medical Service Subcommittees a pecuniary penalty had been inflicted in only 324 instances. In two exceptional cases the penalty had been £1000 and £500 respectively; otherwise the amounts had been under £100, except in ten cases where that amount had been withheld. No penalty was inflicted until the doctor had been given an opportunity of making representations. The withholding of grant was not a fine or penalty in the ordinary sense of the word; it was the recovery of money which should not have been paid to the doctor because he had not earned it.

The Chairman said that the number of cases against doctors appeared very small having regard to the total number of doctors in insurance practice.

Dr. Brackenbury said that his Committee had not, in any part of their case, objected to the disciplinary control with which Mr. Brock had dealt. Their objection was directed solely to the elaborate certification rules, which had no parallel in private practice.

Club Practice in Scotland.

Mr. J. Jeffrey, secretary to the Scottish Board of Health, gave figures relating to club practices in Scotland. An agreement had been signed in 1919 which applied to the whole mining industry and affected 140,000 to 150,000 workers and 400,000 dependents. The system was that the workers (who were insured under the Insurance Acts) paid a flat rate contribution for the provision of medical treatment to their dependents. The payment was 3½*d.* a week without medicine and 4½*d.* with medicine. Women and children under 16 paid half rates. In the steel and iron industry there was a scheme affecting 8500 workers and 23,000 dependents. The rate here was 4½*d.* a week with medicine, apprentices and boys on low wages paying 1*d.* The average number of dependents covered by each contribution was two and a quarter, and this represented a capitation fee of 7*s.* 1*d.* with medicine or 5*s.* 6*d.* without medicine.

The Court adjourned until 11 A.M. on the 8th.

The King has sent a contribution of £100 to the funds of the Mental After Care Association for Poor Persons convalescent or recovered from Institutions for the Insane, Church House, Dean's Yard, Westminster, London, S.W.

DUBLIN NATIONAL CHILDREN'S HOSPITAL.—The board of the National Children's Hospital, Dublin, has speedily taken steps to organise a staff for the hospital, after the regretted death of Sir Lambert H. Ormsby. Mr. Trevor N. Smith, who had for some time acted as physician to the extern department, is confirmed in that post. Dr. G. E. Nesbitt is appointed visiting physician, and Sir W. Taylor and Sir W. I. de C. Wheeler have been invited to accept the duties of visiting surgeons.

ROYAL INFIRMARY, GLASGOW.—The annual meeting of the managers and nursing staff was held on New Year's day, and was attended by representatives of the other hospitals and of the civic authority. Mr. M. W. Montgomery, the Lord Provost, in his opening address referred to the baronetcy recently conferred upon Sir Donald MacAlister. He spoke warmly of the high standard of proficiency to which professional nursing had attained. Mr. James Macfarlane, chairman of managers, also thanked the nursing staff for their help, and announced that arrangements had been made for extending the quarters available for their accommodation. He referred to the treatment of diabetes in the institution with material manufactured in the laboratory of Prof. Noël Paton, and stated that he foresaw the addition of a biochemical laboratory to the infirmary, to control this treatment and to investigate other similar problems. The financial situation was outlined by Mr. T. Warren. The ordinary income had increased during the year from £80,964 to £82,827, and if legacies and special contributions were added the total became £115,251. On the year's working they had been able to place to their capital account £6212. He noted that receipts had increased from £48,564 in 1899, to £151,910 in 1923. A final sum of £30,000 was to be received shortly from the trustees of Miss Schaw.

Correspondence.

"Audi alteram partem."

INSULIN IN THE TROPICS.

To the Editor of THE LANCET.

SIR,—Statements have appeared recently in the press that insulin is unstable in the tropics and has been found to have lost activity on arrival in India. Experiments have been carried out which show that the reports to the effect that insulin is not resistant to tropical climatic conditions should be accepted with considerable reservation so far as "A.B." insulin is concerned. A sample from a batch of "A.B." insulin was heated to a temperature of 95° F. for a month, the activity being carefully determined both before and after the treatment. The result of this careful test showed that insulin "A.B." brand had retained its activity without any detectable loss.

Further testimony to the stability of "A.B." brand insulin is afforded by the following facts. We have had returned to us from India two bottles of our insulin "A.B." brand. This insulin was part of a batch which had been reported as having lost activity in India. We have had the contents of one of the bottles re-tested here, utilising for this purpose a bottle which arrived back in a half-empty condition, as we considered that this would be the most stringent test. The figures obtained showed with remarkable agreement that the activity was exactly the same as when the batch was first issued, two and a half months previously, in spite of the fact that this insulin was sent out without any precautions as to cold storage during its journey to and from India, nor, so far as we are aware, was kept in cold storage while in India.

An interesting fact which may throw some light upon the reports of loss of activity in India is that contents of the same bottle when tested in India did not reduce the blood-sugar of the rabbits to anything like the same extent as we found it to do here before and after going to India. Four times the amount which reduced the blood-sugar to the limit (i.e., 0·042 per cent.) in England only reduced the blood-sugar to 0·062 in India. None of the rabbits in India went into convulsions, while on one-half the dose our rabbits went into very severe convulsions—one of them, indeed, being so severely convulsed that the life of the rabbit was with difficulty saved. These results suggest the possibility that rabbits in India do not give the identical quantitative reaction observed in temperate climates, owing to climatic conditions, the nature of the food administered, or some such variant. These striking and apparently conclusive tests afford very satisfactory evidence of the stability of "A.B." insulin in the tropics.

We bring the foregoing information to the notice of your readers, in order that the benefits of the insulin treatment may not be unnecessarily withheld from diabetic sufferers in the tropics.

We are, Sir, yours faithfully,

THE BRITISH DRUG HOUSES, LTD.
Jan. 7th, 1924. ALLEN AND HANBURYS, LTD.

CARDIAC DYSPNŒA.

To the Editor of THE LANCET.

SIR,—Permit me to acknowledge the kindly and interesting answer of Dr. Claude Wilson to my rather hastily written letter, a revised proof of which, on account of the holidays, did not reach you in time. The effect of a morphia injection in paroxysmal dyspnœa is so dramatic that we take less note perhaps of its solace in the burden of that more ordinary dyspnœa which to such patients makes night a horror. And the good effects soon become apparent, not only in the immediate relief, but also in a larger field of repair; in a better air entry, increasing flow of urine, steadier rhythm of the heart, and subsiding hepatic and abdominal congestion. It is hard to be sure, but I think that the injection of morphine is more effectual than opium, though for secondary reasons one may occasionally prefer opium—e.g., in the form of Dover's powder. Opium is more apt to foul the tongue and to constipate the bowels. I agree that omnipon appears more expedient than opium. Paroxysmal renal dyspnœa, as in primary contracted kidney, is so terrible a fight that one cannot refrain from injection of morphia, though I suppose we use it at greater risk. Happily in this way I have met with no mischance. And when with "cardiac kidney" uræmic symptoms appear, the injection may be used with confidence. It is surprising to see how with the cardiac relief these consequential uræmic states clear up, and the kidneys return to their natural use.

Before closing, may I plead with Dr. Wilson for precision in the use of our terms, and protest against the use in science of colloquial phrases, or at any rate against contentment with them. The term "cardiac asthma" is to be deprecated for many reasons. It is very misleading, especially to the student who is led to confuse two opposite attitudes of the thorax. In asthma the respiration is held in arrest, in cardiac dyspnœa it is violently active. A few days ago Lord Crewe protested against the English lack of precision in language, and against the defence that such and such a phrase is in common use and so cannot be resisted. In business affairs, he said, we may be satisfied with a "thereabouts," but not in science or letters; that we need more of the Greek and French "esprit de précision," more care for definition. In common conversation we may be forgiven if we call a whale a fish; but we should be surprised to see such laxities in a scientific journal.

I am, Sir, yours faithfully,

Cambridge, Jan. 6th, 1924. CLIFFORD ALLBUTT.

ON SOME USES OF DIGITALIS.

To the Editor of THE LANCET.

SIR,—I am very desirous not to misconstrue Dr. G. A. Sutherland and would therefore quote again from him: "I am one of those humble unbelievers who has hitherto failed to find *any* drug, which will act directly and beneficially on the cardiac power of contraction" (italics mine). I now learn from his letter in the Jan. 5th issue of THE LANCET that he uses the word *directly* in the strict pharmacological sense of immediate contact action, thus excluding action through the nerves, whereas I was using it in the common dictionary sense of an uninterrupted sequence of cause and effect. Had this matter been clear to me I should not, of course, have instanced the use of ammonia when applied to the nostrils, and I withdraw it therefore. But now, having accepted his pharmacological definition, what am I to say, when, on my production of a *pharmacological* example of the direct action of ammonia upon the isolated frog-heart, he accepts in one breath, "all the laboratory proof" I want, and in the next blows his acceptance to the winds in the following sentence: "The saddening thing is to see a clinician accepting the results of laboratory experiment as applicable to the treatment of diseased persons, without any attempt to test them carefully at the bedside." Is that a just remark to have made when I had actually prefaced my pharmacological instance by quoting Prof. G. B. Halford's *clinical* experience of the value of the intravenous injection of ammonia in the heart failure (collapse) of snake-bite? Such injection has, until recently, furnished our nearest approach to direct action upon the heart, and this clinical experience was in accord with the pharmacological finding. No, Dr. Sutherland need not mourn on my account, in this respect, for I am fully alive to all the difficulties which beset the transference of laboratory results to clinical medicine, and elsewhere have expressed myself quite clearly on that point. After this remark of his one reads further on with not a little surprise the following words: "No one appreciates the value of pharmacological work in the laboratory more than myself."

I conclude my argument with another piece of clinical work, citing Dr. Bodon's paper (THE LANCET, March 24th, 1923). I cannot go into this now, but would strongly advise all those interested in the subject to consult the original article, which, to my mind, is very convincing. This much, however, I would say here, that did Dr. Bodon's case stand alone it could not be ignored, and that taken together with the other evidence adduced, it makes out the strongest case for immediate intracardiac injection in cases of death from heart failure. I would go further and say that it makes a perhaps stronger case for intracardiac injection to anticipate death, other means having failed. Need one say that a great harvest of successes will not be expected from this method when thus applied to those who are *in extremis* through disease; in the case of sudden death from accident or in the course of an operation, where the vital powers are unexhausted, the method should promise much more.

To conclude, I am sorry that Dr. Sutherland finds my closing remarks provocative and I hope he will accept my assurance that they were not intended to be personal, but to apply rather to the general attitude adopted by a modern school of cardiologists, no doubt quite sincerely: I refer to the question of the advances made in the clinical use of digitalis. What I have said amounts to this, that in my opinion the rules laid down by Dr. George Balfour for the clinical administration of digitalis, some 50 years ago, have not been appreciably advanced since. Dr. Sutherland outdoes me and goes even further back—namely, to Dr. Withering, as the "father of digitalis therapy," and he quotes in evidence a fine piece of observation of the latter, which, by the way, is also quoted by Dr. Balfour. Dr. Withering, therefore, has had his reward; but no one would say that between that date 1785 and the date of Dr. Balfour's teaching, the use of digitalis had not made great advances in selection of case and precision of dosage. Why in Withering's day the differentiation of the dropsies into cardiac and renal had not even been made. But to praise the past does not mean to belittle the present, and for Sir James Mackenzie's labours and achievements I have the highest admiration, even though I be not able everywhere to follow his conclusions.

I am Sir, yours faithfully,

Jan. 7th, 1924. HARRINGTON SAINSBURY.

ON THE HUMANITY OF METHODS OF SLAUGHTER.

To the Editor of THE LANCET.

SIR,—I think most medical men will agree with Dr. Leonard Hill (THE LANCET, Dec. 22nd, 1923, p. 1382) that practically no pain is caused by the throat cutting of animals if both carotids are at once severed as in the Jewish method. I trust, however, that discussion is not to be side-tracked on the advantage or disadvantage of the Jewish method, as no doubt, whatever the result of the discussion may be, the Jewish method will continue to be used by Jews and will not be adopted by English butchers.

To my mind, what calls for immediate reform is the common method of slaughter of oxen by the pole-axe. Dr. Hill rightly states that "the pole-axe is not a certain method in the case of restive animals and in the hands of inexperienced slaughterers." May I go further and say that it is not a certain method in the hands of the most experienced, mis-hits even with them being not infrequent, with resultant intense pain to the animal which often bellows in agony. I strongly advise medical officers of health to concentrate on the immediate abolition of the pole-axe. In Brighton the free bullet has been used in the slaughter of over 3000 beasts since the new by-laws were introduced, and we have had no approach to an accident and no complaint as to the keeping properties of the meat.

I write because I see before us a long discussion on the Jewish methods of slaughter, and the effect of the various methods of slaughter on the keeping properties of meat. However interesting and valuable these discussions may be, they should not delay the immediate adoption of by-laws forbidding the use of the pole-axe. Our first duty is to prevent unnecessary suffering, and this admittedly will occur from time to time and in revolting fashion so long as the pole-axe is in use.

I am, Sir, yours faithfully,

DUNCAN FORBES,

Jan. 3rd, 1924. Medical Officer of Health, Brighton.

THE BONE MARROW AFTER EXPERIMENTAL SPLENECTOMY.

To the Editor of THE LANCET.

SIR,—Apropos of the changes in the bone marrow of normal animals after splenectomy, a subject annotated in your issue of Dec. 8th, 1923 (p. 1254), permit me to state that observations begun by Dr. J. H. Musser and myself shortly after the termination of the war [1] lessen the differences between Dr. Johnstone's conclusions and those reported by Drs. Pearce, Frazier, and myself in our work on the spleen and anæmia. This portion of our spleen work, by the way, was done by Drs. Pearce and Pepper and was first reported separately.[2]

In regard to the facts observed, the earlier work on dogs showed slight changes in the bone marrow of seven dogs between the twenty-fourth and eighty-fourth days after splenectomy, then no observations four and five months after splenectomy and more marked changes from six to 32 months after splenectomy. In our later observations on monkeys (which were controlled in some instances by preliminary and intercurrent biopsies on the femoral bone marrow of the splenectomised animals and nodectomies, &c., on the controls), marked cellular hyperplasia was found four and a half and five months after splenectomy (though it had been absent before splenectomy) and slight two and a half months after; and in two other animals was found to be still marked at 24 and 27 months after splenectomy. The difference, then, between Dr. Johnstone's and our findings is chiefly a matter of degree. He found "an increased production of red blood cells clearly observable on the average, within four weeks after splenectomy, which gradually increases to the maximum about the end of the twelfth week." We found slight cellular hyperplasia beginning in dogs about the same time, and most marked in the only two monkeys examined near the time of his maximum increase. We also were able to extend the period in which hyperplasia is known to exist to more than two years. When the different conditions of the experiments are taken into account (different species of animals, rib v. femoral marrow, &c.), it is perhaps surprising that even greater differences were not encountered.

In regard to the conclusions to be drawn, I should now be inclined to agree with Dr. Johnstone that "the marrow which follows splenectomy is probably secondary and compensatory to the anæmia which follows removal of the normal spleen," although it must always be borne in mind that increased cellular content of the bone marrow does not necessarily mean increased hæmopoiesis. Also bone-marrow studies are always necessarily incomplete (unless all the bones of the body are studied), because it is often possible to get a marked hyperplasia in the marrow of one bone and none in an adjacent bone—e.g., femur and tibia—or much less even in another part of the same bone. We have always, therefore, used the upper third of the femur as a basis for bone-marrow studies and would recommend that some such standard site be used by all bone-marrow investigators. The reason for the persistence of the cellular hyperplasia remains to be

[1] Arch. of Int. Med., 1923, xxxi., 686.
[2] Jour. of Exp. Med., 1914, xx., 19.

explained. If it is "an expression of the law of regeneration in excess," then there should be a correspondingly increased amount of blood destruction, detectable by quantitative urobilin estimations, which, as far as I know, has never been demonstrated. More probable seem earlier explanations of ours that it is partly at least due to non-hæmopoietic cells, concerned with the functions of the missing spleen, such as the breaking up of effete erythrocytes and utilisation of their products.

The complex problems of splenic functions have seemed to some recent writers to be so hopelessly obscure, that I have ventured to attempt to explain discrepancies that are more apparent than real. In the same way, an apparently adequate explanation has been offered, in the article in the *Archives of Internal Medicine* previously referred to, of the apparently contradictory blood pictures found by different investigators after splenectomy.

I am, Sir, yours faithfully,

EDWARD B. KRUMBHAAR, M.D.,
Director of Laboratories.

Philadelphia General Hospital, Dec. 20th, 1923.

GASTRIC ULCERATION.

To the Editor of THE LANCET.

SIR,—I read with regret the leading article under the above heading which appeared in your columns on Dec. 29th last. With regret, because, in my opinion, the article contains statements which cannot be substantiated upon critical examination, and because the article as a whole tends to convey a false impression of the present-day position of the therapeutics of simple ulcer of the stomach and duodenum.

It is usual, in discussions where the opinion of surgeons and physicians is divided, for the former to contrast their best results with those which follow the average, or less careful, forms of medical treatment; physicians, on the other hand, will tend to over-emphasise the disastrous consequences of incompetent surgery. From your columns we have reason to expect a more judicious examination of any such problem. But on what authority do you state that "it is without exaggeration to say that the medical mortality from perforation and hæmorrhage is vastly greater than that incidental to surgery, which in a very high percentage of patients leads to a permanent cure"? To describe the deaths which follow perforation and hæmorrhage as a "medical mortality" is quite unjustified. A large series of post-mortem records which I have recently examined discloses the facts that (1) many of such deaths occur in patients who have had neither symptoms nor treatment of any kind before the final catastrophe; (2) that in not a few of these cases perforation or hæmorrhage had occurred subsequent to surgical treatment. Are such to be included in the "medical mortality"?

In the same series it was brought out that the deaths from shock or complications, occurring as the direct result of surgical intervention, whilst considerably less numerous than those following perforation, were far more frequent than those due to hæmorrhage. Where, then, lies your justification for saying that the "medical mortality" is "vastly greater"? Is such a statement "without exaggeration"? It is well to quote Sir Berkeley Moynihan's magnificant series of cases, in which there has been no operative death for many years, but it is perhaps injudicious to do so without emphasising the important fact that this series is a tribute not only to the skilful technique of that distinguished surgeon, but even more to the care with which he has selected those patients well able to withstand the shock of operation. All who have studied the question carefully are agreed that when gastrectomy is performed with less discrimination, when those cases with large ulcers attached to the pancreas or liver are not treated by jejunostomy, the operative mortality is a formidable one. So long as surgeons confine their main attention to the less serious degrees of ulceration their results must tend to be satisfactory; when, on the other hand, extensive forms of the disease are treated radically the result is very different from what the readers of your leading article are led to imagine.

The references to medical treatment in this article are, I believe, equally unfair. Physicians do display a certain hesitancy in "withdrawing the curtain of the abdominal wall" whenever they wish for precise information as to the progress of a patient; but even surgeons are inclined to accept the evidence of the X rays and of the patient himself when once their operation is performed and all is going well; and, if such standards are to be accepted in either case the experience of those physicians who have given special attention to these patients is again very different from what is suggested in your article. In March, 1922, I had occasion to summarise my views on the treatment of gastric ulcer, the subject having been recently debated by a joint meeting of physicians and surgeons at the Royal Society of Medicine. I suggested that the correct attitude of the physician or general practitioner when confronted by a case of gastric ulcer should be as follows:—

1. To treat immediately all sources of sepsis in the mouth and naso-pharynx.
2. To select without delay the cases in which surgery is indicated. These include: (*a*) all cases with chronic pyloric obstruction; (*b*) all cases which have relapsed after a course of thorough medical treatment; (*c*) all cases with a history extending over many years; (*d*) all cases with large ulcers adherent to surrounding structures, and practically all cases in which a test-meal is retained in the stomach for more than six hours; (*e*) all cases where economic position makes prolonged medical treatment impossible.
3. To treat the remaining cases medically, the main lines of treatment being: (*a*) to secure physiological rest for the stomach; (*b*) to neutralise hyperacidity; (*c*) to continue treatment for a sufficient time to procure genuine firm healing; (*d*) to protect the patient against relapse.

I believe that this opinion, to which I adhere to-day, contains no bias against the expert abdominal surgeon; and the fact that it received strongly expressed approval from Dr. W. J. Mayo, of Rochester, U.S.A., confirms me in this belief. But I would add that if my opinion has had any tendency to increase the incidence of reckless abdominal operations, as I feel your leading article may do, then I would have done better not to have written it. It is surely not right that the same journal which has published Dr. E. I. Spriggs's account of "Sixty-five cases seeking relief after short-circuiting operations" should now imply that gastric surgery has reached a position wherein failure is almost unknown; nor can I harmonise the general impression conveyed by your present article with the conclusions expressed by such authorities as Dr. N. A. Nielson or Prof. Knud Faber, of Copenhagen, which were published in your columns, or commented on with approval, within the last 12 months.

Granted that surgery can cure many cases where purely medical treatment has failed, and that in other cases cure may follow surgical treatment rapidly, whilst medical treatment is laborious, I am bound by my experience to emphasise that the death-rate after major operations on the stomach remains a serious one, and that there is an equally serious percentage of cases in whom surgery has not led to permanent cure. The withdrawal of the "curtain of the abdominal wall" is often the prelude to legitimate drama, but in an appreciable number of cases to tragedy of the grimmest description.—I am, Sir, yours faithfully,

Devonshire-place, W., Jan. 7th, 1924. T. IZOD BENNETT.

To the Editor of THE LANCET.

SIR,—With reference to the leading article on this subject in your issue of Dec. 29th last, one could not emphasise too strongly the dangers of such a clear cut statement as: "Surgery seems definitely to have established itself as the only effective treatment for gastric ulcer." If the problem was so easy to solve, much discussion might have been spared to members of the profession who are daily made more uncertain by the contradictory opinions expressed by experts of

high standing. It is true that medical treatment can cure many patients at the expense of iron discipline and also that it fails in a debatable number of cases to prevent hæmorrhages, perforation, stenosis, and cancer. But it is equally sure that surgery entails an added immediate and remote death possibility and is unable in another percentage of cases either to cure or avert recurrence.

Surgery further decisively aggravates a few cases and rarely creates a fearful danger—namely, gastro-jejunal ulcer. This disaster certainly occurs in less than 5 per cent. of operated cases, and those who have not had the misfortune of witnessing the sad plight of one of these patients should read descriptions such as given by Erdmann (American Annals of Surgery, vol. lxxiii., pp. 436–39) or of the hundreds widespread in the Austro-German literature. I believe that any doctor afflicted with recent peptic ulcer would then hesitate to entrust his life even to one of those exceptionally highly specialised surgeons until medical treatment had been intelligently tried. A well-known surgeon, who suffered from duodenal ulcer, was operated on by a French professor who will leave a name for his research on lymphatics of the stomach. Simple gastro-enterostomy was performed and jejunal ulcer appeared in a few months. The most experienced operator in Europe then resected the diseased stoma, performing an extensive gastrectomy terminated by a polya, in barely few weeks a fresh marginal ulcer appeared with fatal results!

Cases of this kind are not unique. There is not even the slightest consensus of opinion between operators like Moynihan, Pauchet, Haberer, Kümmell, W. Mayo, Balfour as to the wisest operative processes. While some of these advocate gastrectomy, others are conservative, and two who strongly recommended excision ten years ago now reject it. This suggests that matters are not so smooth as some surgeons would make us believe. It is difficult to admit that extensive systematic gastrectomy upon unselected cases including men above 50 and adherent ulcers of the lesser curvature will ever be performed with a death-rate under 5 per cent. or more.

Extensive gastrectomy with its higher primary mortality does not even confer those guarantees from jejunal ulcer expected by some masters; more than eight cases have been reported in the German literature and I know of several others. It is admitted, on the other hand, that from 25 per cent. to 10 per cent. (Balfour) of gastro-enterostomies are failures, and this means that a cruel infirmity then aggravates an already difficult position. If the claims of some in favour of this operation are justified, how is it that surgeons like Flint (THE LANCET, Sept. 8th, 1923, p. 508) defend gastro-duodenostomy, which is condemned in turn by others? Is it even well proved that surgeons have the opportunity of following over many years such a majority of their patients as to estimate beyond dispute their own methods? In THE LANCET of Dec. 22nd Walton describes a dyspeptic syndrome of young women, accompanied possibly by sharp hæmatemesis without appreciable organic lesions. Now if operative interference is blindly undertaken on the suspicion of recent ulcers, is it not at the risk of sad mistakes?

Finally, the argument of the unavoidable diet against medical treatment is unintelligible because dietetic restriction is quite as compulsory after any type of operation. It is not reasonably possible to attack the principle of surgery when it attempts to deal with incurable peptic ulcer, but a return to its indiscriminate use as soon as a case is diagnosed with mere probability cannot resist searching criticism based upon facts.—I am, Sir, yours faithfully,

Paris, Jan. 2nd, 1924. DR. E. V. MISRACHI.

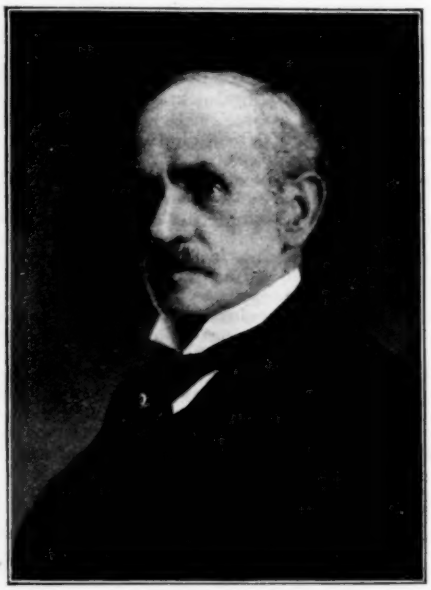
*** The gastric ulcer for which surgery and surgery alone claims to be effective is the chronic ulcer, and although this was implied in our article it might have been stated more explicitly. Dr. Izod Bennett's selection of cases in which surgery is indicated defines the common ground between two branches of the medical profession. On each side there are disputed territories.—ED. L.

Obituary.

SIR JOHN TWEEDY.

THE whole of the medical profession will have learned with regret of the sudden death on Friday last, Jan. 4th, of Sir John Tweedy, while all the senior members of the staff of THE LANCET have reasons for feeling the occurrence as a personal loss.

Sir John Tweedy was the son of Mr. John Tweedy, of Stockton-on-Tees, where he was born in 1849. He was educated at Elmfield, York, and University College, London, proceeding from the College to the hospital, on whose staff at the time the notable figures were the great Sharpey, William Jenner, John Erichsen, Sydney Ringer, Charlton Bastian, Walshe, Russell Reynolds, and Henry Thompson, while many of his contemporaries succeeded to places on the staff. He took the diplomas of the Royal Colleges in 1872, proceeding to the F.R.C.S. some four years later, and from the first showed the direction which his scientific work would take, for in 1871 he published in



SIR JOHN TWEEDY.

these columns a note on Stellation of the Normal and the Cataractous Crystalline Lens. A sequel to this paper, published in 1874, was accompanied with drawings representing enlarged views of the stellate lines on the front of the lenses in one of the cases, and attracted a good deal of attention.

His professional experiences from the beginning were roughly divided into two, the first rising from the intensive study of ophthalmology at the Royal London Ophthalmic Hospital at Moorfields, and the second from his appointment as editor of THE LANCET "Mirror of Hospital Practice." He maintained his connexion with University College Hospital by holding the post of assistant dermatologist, and the clinical experience thus gained was published as a section on diseases of the skin in the earlier editions of Roberts's Text-book on Medicine. But at Moorfields he used to the full his great opportunities of becoming a leading ophthalmologist. He followed his early publications with other useful and practical papers dealing with the physiology and anatomy as well as the surgery and therapeutics of diseases of the eye, and even before his appointment in 1879 as assistant

surgeon to Moorfields he had established considerable private reputation. He was appointed ophthalmic surgeon to that hospital and to the Great Northern Hospital in the same year, 1878, and in the ensuing period contributed largely to Heath's Dictionary of Practical Surgery, where he wrote the articles "Cornea" and "Sclerotic," and Quain's Dictionary of Medicine, where he wrote, among others, the articles "Hemeralopia" and "Nyctalopia." Clinical articles appeared in THE LANCET and elsewhere on operative procedure and the employment of various drugs, and he also wrote occasionally on his special subjects in THE LANCET, where, however, Brudenell Carter and Henry Power were senior members of the staff. In 1881 he was appointed assistant ophthalmic surgeon to University College Hospital, his senior being J. F. Streatfield, whom he succeeded as full surgeon in 1888, while other members of the full staff included some of his teachers whose names have been enumerated, and Frederick Roberts, Prof. Thane, Marcus Beck, Vivian Poore, Gowers, and Sir Rickman Godlee. From 1888 until 1904 he was professor of ophthalmology at University College, being also for a large period of the time surgeon to Moorfields.

His early and long connexion with THE LANCET introduced him, at first perhaps not very usefully, to the leaders of the profession at the very beginning of his career, but such was his obvious honesty and fairness that the members of the hospital staffs, who in the 'seventies and 'eighties still resented the attitude of the paper towards their class, were converted largely by him into hearty coöperators, making the weekly account of hospital activities inclusive and valuable. And the general outlook upon surgery which the systematic visiting of all the operating theatres gave him from the very date of his first obtaining qualifications ensured that his attitude towards his specialty should be always of the broadest as well as of the most practical kind; years later he bore witness to this in his Hunterian oration before the Royal College of Surgeons of England, when he insisted that all good specialism must be founded on good general education. During his term of editorship of "The Mirror" he became an intimate friend of Dr. James Wakley who edited THE LANCET between the years of 1862 and 1886, and through the last decade of that period Tweedy not only contributed the weekly résumé of hospital surgery and many articles in which a wide range of classical knowledge was employed, but he was also largely responsible for the utterance of the editorial views on the constitution of the Royal College of Surgeons of England. Consequently it was as a reformer that Tweedy obtained his first seat on the Council of the College, to which he was elected in 1892. His election disclosed among the Fellows of the College an unexpected sympathy with the claims of the Members, as always advocated in THE LANCET, and those who know the history of the movement which was then in existence for forwarding those claims know also that success would probably have attended the wise and conciliatory attitude which was being taken by the protagonists and supported in these columns by Tweedy. How those who wished to move quicker hampered all progress forms no part of any obituary notice of Tweedy, save that the following should be stated. Within the Council he was perfectly prepared to stand by all that he was known to stand by before his election, but he was not willing to be the spokesman of those who desired to take up a different ground. On the Council of the College he soon obtained a prominent position, because it had become clear to his colleagues that he had the story of the constitution at his finger's ends, that his actions were always scrupulously fair, and that he stood in no fear whatever of the arbitrary manners of certain of his seniors, who undoubtedly regarded his election as a protest against themselves. After just over 11 years' service on the Council, Tweedy was elected President of the College not only at the unusual age of 54 but on the first ballot. He served as President for three years, was given the honorary fellowship of the Royal College of Surgeons of Edinburgh, and the degree of LL.D. by the University of Edinburgh in 1905, and in 1906 received the honour of knighthood.

The qualities which had obtained for Tweedy such signal and prompt recognition at the Royal College of Surgeons were exhibited in many other public capacities, for his services were in keen demand wherever organisation and administration were required, it being recognised that he took no post in an honorary or ornamental capacity, but gave always of his best to the furtherance of the objects aimed at. In addition to remaining attached in a consulting capacity to his various hospitals, he was a trustee of the Hunterian Museum, and a member of the Medical Consultative Board of the Navy. He was President of the Ophthalmological Society at the same time that he was President of the Royal College of Surgeons—a unique distinction; he was at different times President of the Medico-Legal Society, of the Medical Defence Union, and of the Royal Medical Benevolent Fund, while he was a member of King Edward's Hospital Fund for London, where he sat on the distribution committee as member, and later as chairman, for 14 years, and brought a first-hand familiarity of London hospital problems to the discussions. He was a trustee and for some time treasurer of the Medical Society of London, a trustee of the London and Counties Medical Protection Society, and a member of the Council of the Imperial Cancer Research Fund. He was a first-class Latin scholar and had a sound knowledge of Greek, and the results of this interest which he took in classical literature he often employed in public utterances, such as the first Thomas Vicary lecture delivered before the Royal College of Surgeons, and the Annual Oration at the Medical Society of London, both of which excellent discourses were published in our columns and displayed the speaker not only as a classicist, but as possessing sound and varied knowledge on medical history. In recognition of this knowledge he was elected Master of the Worshipful Company of Barbers, at the sex-centenary celebration of the Company.

We have said enough to show that in Sir John Tweedy not only the medical profession but the whole of society has lost one whom it could ill afford to spare. He had been in delicate health for some time, but his death must have been unexpected to all save his immediate entourage. At the Centenary Dinner of THE LANCET, save for an increased deafness, he appeared to his friends to be in his usual health, the laboured respiration, whose cause was never discovered and which made strangers think that he was a serious invalid, having been common to him for the greater part of his life.

Sir John Tweedy married Mary, daughter of Mr. Richard Hilhouse, and had two sons and one daughter. Lady Tweedy is widely known to all the medical profession for her indefatigable and successful work in connexion with the Royal Medical Benevolent Fund Guild.

ROGER ALAN BIRDWOOD, M.D. CAMB.

Dr. R. A. Birdwood, late medical superintendent of infectious hospitals under the Metropolitan Asylums Board, London, died on Jan. 2nd, in his seventy-third year. Born in Bombay in 1851, he was one of the younger of the 14 children of General Christopher Birdwood, Deputy Commissary-General of the Bombay Army and sometime Commander of the Poona Brigade. Dr. Birdwood was educated at the Dollar Academy, at the Blackheath School for the Sons of Missionaries (his maternal grandfather being the Rev. Joseph Taylor, of the London Missionary Society), and at King's College, London. Unsuccessful in an effort made, at the minimum age, to gain admission to the I.C.S., he went with a scholarship to Peterhouse, Cambridge, and graduated M.A. He took his M.D. degree from Guy's Hospital, and after a short period of work under the Metropolitan Asylums Board went out to South Africa for service in the Zulu Campaign. There he distinguished himself in medical service and received the medal and clasp. Returning to London,

Dr. Birdwood was appointed house surgeon to the Gravesend Infirmary, and by his energies secured the provision of a separate ward for children. In 1884 the Asylums Board appointed him medical superintendent of the hospital ships. He was an able administrator and a skilled organiser, and in 1892 he accepted the responsibility of planning and furnishing the North-Eastern Fever Hospital at Tottenham, where his experience, combined with his personal qualities, his energy, and his optimism, were the chief factors which welded the institution into an efficient whole. Some years later he was entrusted with a similar task in the Park Fever Hospital at Hither Green. There he remained in charge for 18 years, during which time he carried out its conversion to the children's service, and later its re-conversion for infectious diseases. The Metropolitan Asylums Board often sought his advice and assistance on questions of policy, and it was on his initiative that its hospitals were brought into use for medical instruction. When he retired in 1915 the Board, as a recognition of his exceptional professional services, added five years to his actual period of service for the purpose of computing the superannuation allowance.

An old friend and former colleague at Tottenham Fever Hospital, Dr. F. M. Turner, sends the following appreciation of Dr. Birdwood's work: "He was a man of high ideals both in medicine and other matters. Many of the causes that he took up and of the opinions that he advocated were not popular at the time, but have been since justified by experience or by being later adopted as orthodox doctrine. His advocacy of the policy of sending all small-pox cases out of London to the hospital ships at Dartford was accompanied by the prophecy that we should then get rid of small-pox in London except for fresh importations, a prophecy that has come true. His view that alcohol was a poison and did more harm than good in severe infectious fevers was based on his own observations in small-pox cases. Many a lecture did his junior medical officers receive if they prescribed it. He was not quite consistent, for when he had a patient dying he would himself often order champagne. And if this doctrine is still an unsettled question, the statistics as to the decline in the alcohol prescribed in both the London general hospitals and the fever hospitals, which have been often quoted, show that his views, unorthodox in 1890, are very close to the average medical opinion at the present time. Into the vaccination controversy Birdwood was necessarily drawn. He held that one vaccination mark is quite as good a protection as three or more, and used always to vaccinate in one place only at the small-pox hospital ships. This view is not yet accepted by orthodox authorities, but the M.A.B. statistics show that it is much nearer the truth than the common opinion that two vesicles give twice the protection of one. In politics Birdwood was a Radical and in favour of most progressive movements. He favoured the entry of women into the medical profession, and there were usually women doctors on the staff at Tottenham. He always strove for the right as he saw it, and strove hard."

Touching his personal qualities, a former senior assistant medical officer at the Park Hospital writes of his old chief: "Three of Roger Birdwood's characteristics are green in my memory. His intense personal interest and keenness to help in the work and future career of the men whom he trained, his hatred of conventionality and humbug, and his love for children, animals, and flowers. To Birdwood there was no such 'thing as 'routine work.' Every apparently unimportant detail was to him a matter of vital importance to the welfare of the hospital which he ruled and loved so well, and much of his day was spent in personal conversation with officials of every grade on the importance of their work and the effect which it had on the welfare of the patients. To his assistant medical officers he was a hard and sometimes irascible taskmaster, but he was also a sympathetic friend and a real inspiration and driving force. He never accepted a view simply because it was popular or in the text-books, and yet he was a far more severe critic of his own opinions than of the other views which he often so scathingly derided. His criticism often hurt for the moment, but it was always followed by a glimpse of the warm heart underneath and was ever constructive. Birdwood was really, though perhaps unconsciously, often in advance of his times. In his criticism, for instance, of the conventional attitude towards the antitoxin treatment of diphtheria, which we A.M.O.'s were apt to regard as an article of faith, he forestalled much of the subsequent work on anaphylaxis, though he was apt to regard the pathological laboratory as a funk-hole in which lazy medical officers used to prolong the after-breakfast pipe. His reputation as an intuitive clinician of rare skill and a born administrator was well known to those who had the privilege of working under him. He was also a well-beloved master and friend."

Dr. Birdwood's only son, Lieutenant H. F. Birdwood, of the Flying Corps, was killed early in 1916 in an air fight over the enemy lines on the Western Front.

JAMES LAMOND LACKIE, M.D., C.M., F.R.C.P. EDIN.

THE death took place during his sleep in the early morning of Jan. 5th of Dr. J. Lamond Lackie, physician to the Royal Maternity and Simpson Memorial Hospital, Edinburgh. Dr. Lackie was 56 years of age and apparently in excellent health. He was cut off in the full vigour of his professional activities.

Dr. Lackie was born at Montrose, where he received his early education. Later he attended the arts classes at Aberdeen University for a short time. In 1885 he came to Edinburgh to commence his medical studies, and, after an exceptionally brilliant career as an undergraduate, he qualified with first-class honours in 1889, when he was awarded the James Scott Prize in obstetrics. It was the gaining of this prize which determined his future career. In 1894 he took his M.D. degree with honours, and in 1896 became a Fellow of the Royal College of Physicians of Edinburgh. After filling several junior hospital appointments in Edinburgh and a short period of general practice in Ventnor as assistant to Dr. J. G. S. Coghill, he returned to Edinburgh as assistant to Sir Halliday Croom. His association with Sir Halliday Croom, for whom he had the greatest admiration, influenced him in many ways, and to that influence no doubt he owed much of his skill and proficiency.

At the time of his death Dr. Lackie held many important appointments. He was one of the senior physicians at the Royal Maternity and Simpson Memorial Hospital, senior gynæcologist in Leith Hospital, and senior gynæcologist in the Hospital for Women at Archibald-place. He was also a valued member of the Council of the Royal College of Physicians, and was examiner in midwifery and gynæcology to the Universities of Edinburgh, Aberdeen, Durham, and St. Andrews. In November last he resigned office as President of the Edinburgh Obstetrical Society, and his presidential address,[1] which discussed the advances in obstetrics and gynæcology in his time, showed the masterly grip he had on his subject and the breadth of his outlook. He was President of the British Gynæcological Congress which met in Edinburgh last year, and the unqualified success of that meeting was in large measure due to his genial personality and the esteem in which he was held by his professional brethren. His practice as an obstetrician and gynæcologist was extensive, and his special knowledge and skill were often sought and always valued by his fellow practitioners. Dr. Lackie inspired confidence, esteem, and affection in all his patients and in all with whom he came in contact. His interests outside his professional life were many, and his tall, commanding presence,

[1] THE LANCET, Nov. 24th, 1923, p. 1158.

his cheery, optimistic personality brought him many friends. He was a keen golfer and curler, and fond of shooting. One might say, briefly, that he was a man widely and deservedly loved.

Dr. Lackie is survived by his wife, son, and daughter, to whom will go out the sympathy of his many friends.

Medical News.

UNIVERSITY OF LONDON.—A Course of Three Advanced Lectures in Hygiene on the Influence of Improved Town Planning and Housing in Public Health will be given at University College, Gower-street, London, W.C., by Prof. John Robertson, at 5 P.M. on Jan. 18th, Feb. 1st, and Feb. 15th. The first lecture will deal with existing conditions which prejudicially influence health in the housing and town planning of English towns, the second lecture with standards of accommodation and of environment which are essential for good health, and the third lecture with the results to be achieved, the question of cost, and the propaganda necessary to obtain the best results. At the first lecture the chair will be taken by Prof. H. R. Kenwood. The lectures, which will be illustrated with lantern slides, are addressed to advanced students of the University and to others interested in the subject. Admission is free, without ticket.

ROYAL SOCIETY OF MEDICINE.—The next social evening will be held on Jan. 16th, at 8.30 P.M., when Fellows, Members of sections, Associates and their friends will be received by the President, Sir William Hale-White, and Lady Hale-White.

Owing to the illness of Dr. Arnold Chaplin, whose lecture had been previously announced, Sir Arthur Keith will give a short lecture, entitled Punch as an Anthropologist, at 9 P.M. It will be illustrated on the epidiascope. The library will be open, and various objects of interest will be shown, including an exhibition of hand-loom silks and pottery.

ROYAL INSTITUTION.—The hour of the afternoon lectures at the Institution has been altered this year from 3 to 5.15 P.M., except on Saturdays when the hour remains 3. This decision will be welcomed by many who have hitherto been unable to attend these interesting lectures. The courses begin on Tuesday next, with the first of two lectures by Prof. W. E. Dixon on Drug Addictions.

CHELSEA CLINICAL SOCIETY.—A meeting will take place at the Club Room, St. George's Hospital (entrance through main doors during rebuilding), on Jan. 15th at 8.30 P.M., when a discussion on the Treatment of Functional Nervous Disorders will be opened by Dr. S. A. Kinnier Wilson.

MEDICO-LEGAL SOCIETY.—A meeting will be held at 11, Chandos-street, Cavendish-square, London, W., on Jan. 15th, at 8.30 P.M., when a paper will be read by Sir Francis Newbolt, K.C., on Evidence of Resemblance in Paternity Cases, which will be followed by a discussion.

GUILD OF PUBLIC PHARMACISTS.—A lecture will be delivered by Mr. E. W. Morris, house governor of the London Hospital, on the Future of Voluntary and Municipal Hospitals, at 17, Bloomsbury-square, on Jan. 16th, at 8 P.M. Dr. H. L. Eason will preside.

MANCHESTER ROYAL INFIRMARY.—The Old Residents' Club will hold a dinner at the Midland Hotel, Manchester, on Feb. 5th. Any old resident who has not received a notice is asked to communicate with the hon. secretaries of the Club, at the Royal Infirmary.

AMERICAN MEDICAL ASSOCIATION: ANNUAL MEETING.—The date of the next annual gathering of this Association has been fixed for June 9th to 13th, 1924. All the sessions will be held on the Municipal Pier at Chicago.

ROYAL MEDICAL BENEVOLENT FUND GUILD.—A concert in aid of this Guild will be given by the Stock Exchange Male Voice Choir on Jan. 22nd, at 8 P.M., at the Wigmore Hall, Wigmore-street, London, W. Further particulars and tickets may be obtained from the Hon. Organiser, Mr. C. Godwin, 25, Austin Friars, E.C. 2.

LONDON NEUROLOGICAL CLINIC.—The sixth annual dinner will be held at Princes' Restaurant, Piccadilly, London, W., on Jan. 26th, at 7 for 7.30 P.M. Tickets 15*s.* each. The guest of the evening will be Lord Dawson. Past and present members who wish to be present should notify the treasurer, Dr. E. F. Pratt, 15, Clarges-street, W., before Jan. 19th.

ROYAL INSTITUTE OF PUBLIC HEALTH.—A Course of nine lectures on Tuberculosis will be delivered in the Lecture Hall of the Institute, 37, Russell-square, London, W.C. 1, on Wednesdays at 4 P.M., from Jan. 16th to March 12th. Prof. S. Lyle Cummins will give the opening lecture on Tuberculosis: How and When is it an Infective Disease? and the subsequent lecturers will be Dr. G. Lissant Cox, Sir Henry Gauvain, Dr. S. Vere Pearson, Dr. P. C. Varrier-Jones, Dr. Marcus S. Paterson, Dr. A. C. Inman, Dr. B. T. J. Glover, and Dr. G. B. Dixon.

DUBLIN (83) GENERAL HOSPITAL ANNUAL DINNER.—The annual dinner of the members of the Dublin Units who served at 83 (Dublin) General Hospital in France in 1917–18 was held on Jan. 5th, at Mills' Hall, Dublin. Sir William Taylor, who organised the units, presided, and there were about twenty present. The members entertained as guests General R. H. S. Sawyer and Prof. A. Fullerton, who had been D.D.M.S. and consulting surgeon respectively in the Boulogne area when the hospital was working, and Mr. A. Miller, registrar of the Royal College of Surgeons in Ireland.

Medical Diary.

SOCIETIES.

ROYAL SOCIETY OF MEDICINE, 1, Wimpole-street, W.

MEETINGS OF SECTIONS.

Tuesday, Jan. 15th.

GENERAL MEETING OF FELLOWS: at 5 P.M.
Ballot for election to the Fellowship.

PATHOLOGY: at 8.30 P.M.
Communications, &c.:
Mr. R. J. Gunther: Demonstration of a case of Arteriosclerosis in a Crocodile of the Mesozoic Age.
Mr. J. K. Clarke: Bacteriology of Dental Caries.
Mr. A. Fleming: Accuracy of Measurements in Capillary Tubes.

Wednesday, Jan. 16th.

HISTORY OF MEDICINE: at 5 P.M.
Paper:
Lieut.-Colonel H. A. L. Howell, R.A.M.C. (Ret.): Medical Services at the Battle of Waterloo.

WAR.
Members of the War Section are cordially invited to attend the above meeting.

SOCIAL EVENING.
The next Social Evening will be held on Wednesday, Jan. 16th, at 8.30 P.M., when Fellows, Members of Sections, Associates, and their friends will be received by the President, Sir William Hale-White, and Lady Hale-White, at 8.30 P.M.
Owing to the illness of Dr. Arnold Chaplin, whose lecture has been announced on previous notices, Sir Arthur Keith has kindly agreed to give a short lecture in his place, entitled Punch as an Anthropologist, at 9 P.M. It will be illustrated on the epidiascope.
The Library will be open and various objects of interest will be exhibited. Music, light refreshments, and smoking.

LIBRARY.
On this evening the principal Reading Room will be closed at 5 P.M., but readers will be accommodated in other rooms.

Thursday, Jan. 17th.

DERMATOLOGY: at 5 P.M. (Cases at 4 P.M.)

Friday, Jan. 18th.

ELECTRO-THERAPEUTICS: at 8.30 P.M.
Papers:
Dr. C. Beresford Alexander: Electro-therapeutic Methods in the Treatment of Fractures.
Dr. Martin Smart: Injuries to Muscles and Joints and their Treatment by Graduated Contraction.

MEDICAL SOCIETY OF LONDON, 11, Chandos-street, Cavendish-square, W.
MONDAY, Jan. 14th.—8 P.M., Pathological Meeting. Specimens. Dr. H. G. Butterfield will give a demonstration of his method and apparatus for micro-photography.

HUNTERIAN SOCIETY.
MONDAY, Jan. 14th.—(At the London Mansion House.) Sir J. Thomson-Walker: Hunterian Oration: Infections of the Urinary Tract due to the *B. coli communis*.

ROYAL SOCIETY OF TROPICAL MEDICINE AND HYGIENE, 11, Chandos-street, W.
THURSDAY, Jan. 17th.—8.15 P.M. (preceded by a demonstration at 7.45 of Various Dysenteric Conditions) a paper on Local Immunity in Infectious Diseases, by Prof. Besredka, of the Pasteur Institute, Paris, will be read (in English) by his colleague, Dr. Harry Platz.

ROYAL INSTITUTION OF GREAT BRITAIN, Albemarle-street, W.
TUESDAY, Jan. 15th.—5.15 P.M., Dr. W. E. Dixon: Drug Addictions. (Lecture I.)
FRIDAY.—9 P.M., Prof. H. E. Armstrong: The Scientific Work of Prof. Sir James Dewar.

ROYAL INSTITUTE OF PUBLIC HEALTH, 37, Russell-square, W.C.
WEDNESDAY, Jan. 16th.—4 P.M., Prof. S. L. Cummins: Tuberculosis—How and When is it an Infectious Disease?

LECTURES, ADDRESSES, DEMONSTRATIONS, &c.

FELLOWSHIP OF MEDICINE AND POST-GRADUATE MEDICAL ASSOCIATION, 1, Wimpole-street, W.
MONDAY, Jan. 14th, to FRIDAY, Jan. 18th.—NORTH-EASTERN FEVER HOSPITAL. Wed. and Sat., 11 A.M., Dr. F. Thomson: Diagnosis and Treatment of the Acute Infectious Diseases.—ST. PETER'S HOSPITAL FOR STONE. Mon., 2 P.M., Mr. Andrews: Injuries of the Urinary Organs; Tues., 2 P.M., Mr. Joly: Urinary Calculi and Calculous Disease; Wed., 2 P.M., Mr. Morson: Tumours of the Urinary Tract; Thurs., Mr. F. J. F. Barrington: Non-Tuberculous Infections of the Urinary Tract; Fri., 2 P.M., Sir John Thomson-Walker: Urinary Obstruction (this lecture will be given at the Royal Society of Medicine); Sat., 2 P.M., Mr. Harkness: Urethritis in the Male.—THE INFANTS HOSPITAL. 2 P.M., Clinical Demonstrations each day. Mon., 4 P.M., Dr. Eric Pritchard: Modification of Cow's Milk; Tues., 4 P.M., Dr. Mackay: Therapeutic Effects of Ultra-Violet Ray (illustrated); Wed., 4 P.M., Dr. MacCormac: Diagnosis of Skin Diseases in Infants; Thurs., 4 P.M., Dr. D. Paterson: Convulsions; Fri., 4 P.M., Mr. Tyrrell Gray: Pyloric Stenosis.—WEST END HOSPITAL FOR NERVOUS DISEASES, at 73, Welbeck-street, W. Mon., 2 P.M., Dr. H. Carlill: Practical Points in Everyday Neurology; Tues., 5 P.M., Mr. Laming Evans: Orthopædic Treatment of Nervous Diseases. Thurs., 5 P.M., Dr. Carlill: Tabes Dorsalis; Fri., 1.30 P.M., Sir James Dundas-Grant: Labyrinthine Tests.

WEST LONDON POST-GRADUATE COLLEGE, West London Hospital, Hammersmith, W.
MONDAY, Jan. 14th.—10 A.M., Mr. Maingot: Surgical Pathology. 12 noon, Mr. Simmonds: Applied Anatomy. 2 P.M., Mr. Bishop Harman: Eye Dept.
TUESDAY.—12 noon, Dr. Burrell: Chest Cases. 2 P.M., Mr. Sinclair: Surgical Out-patients. 2.30 P.M., Mr. Tyrrell Gray: Surgical Wards.
WEDNESDAY.—10 A.M., Dr. Saunders: Medical Diseases of Children. 12.15 P.M., Dr. Burnford: Medical Pathology. 2 P.M., Dr. Pernet: Skin Dept.
THURSDAY.—10 A.M., Dr. Grainger Stewart: Neurological Dept. 12 noon, Mr. Simmonds: Demonstration of Fractures. 2 P.M., Dr. Scott Pinchin: Medical Out-patients.
FRIDAY.—10 A.M., Dr. Drummond Robinson: Gynæcological Operations. 12 noon, Mr. Endean: Venereal Diseases. 2 P.M., Mr. Banks-Davis: Throat, Nose, and Ear Dept.
SATURDAY.—9.30 A.M., Dr. Burnford: Bacterial Therapy. 10 A.M., Dr. Saunders: Medical Diseases of Children. 10 A.M., Mr. Banks-Davis: Operations on Throat, Nose, and Ear.
Daily, 10 A.M. to 6 P.M., Saturdays, 10 A.M. to 1 P.M., In-patients, Out-patients, Operations, Special Departments.

UNIVERSITY COLLEGE, Gower-street, W.C.
FRIDAY, Jan. 18th.—5 P.M., Prof. J. Robertson: The Influence of Improved Town Planning and Housing in Public Health. (First of three lectures.)

CANCER HOSPITAL, Kensington, S.W.
WEDNESDAY, Jan. 16th.—4.30 P.M., Mr. C. E. S. Phillips: Electricity in the Service of Medicine.

HOSPITAL FOR SICK CHILDREN, Great Ormond-street, W.C.
THURSDAY, Jan. 17th.—4 P.M., Dr. Heald: Treatment of Poliomyelitis by Diathermy.

ST. JOHN'S HOSPITAL, 49, Leicester-square, W.C.
TUESDAY, Jan. 15th.—5 P.M., Dr. H. W. Barber: Lupus Erythematosus.
THURSDAY.—Chesterfield Lecture, 5 P.M., Dr. W. Griffith: Eczema.

QUEEN CHARLOTTE'S LYING-IN HOSPITAL, Marylebone-road, N.W.
THURSDAY, Jan. 17th.—Dr. C. H. Roberts: Ante-partum Hæmorrhage.

UNIVERSITY OF LIVERPOOL POST-GRADUATE LECTURES. (At 3.30 P.M.)
MONDAY, Jan. 14th.—(At the Hospital for Women.) Mr. A. L. Robinson: Genital Prolapse.
TUESDAY.—(At the Maternity Hospital.) Mr. Leith Murray: Ante-partum Hæmorrhage.
WEDNESDAY.—(At the St. Paul's Eye Hospital.) Mr. H. Bywater: Methods of Examination of the Eyes.
THURSDAY.—(At St. George's Skin Hospital.) Dr. F. H. Barendt: Skin Cases.
FRIDAY.—(At the Eye and Ear Infirmary.)

Appointments.

STEELE, R. V., M.B., B.S. Durh., has been appointed Post Office Medical Officer for Camden Town Division (N.W. Head District).

Royal Northern Hospital: GRAHAM, G., M.D. Lond., F.R.C.P. Lond., Physician (with charge of In-patients); BEATTY, C. C., M.B., B.S. Lond., M.R.C.P. Lond., Physician (with charge of Out-patients); MCCOY, H. A., M.B., Ch.M., Assistant Radiologist; ROSE, W. G., M.B., B.S. Lond., Resident Medical Officer; MASON, G. A., M.B., Casualty officer; MACONIE, A. C., M.B., B.S. Lond., and HEMBROW, C. H., M.B., House Surgeons.

Certifying Surgeons under the Factory and Workshop Acts: MACKINLAY, W. H., M.B., C.M. Edin. (Redcar); BODY, T. M., L.R.C.P. Lond., M.R.C.S. (Middlesbrough); MOORE, P. W., M.B. Lond. (Coggeshall); FIRTH, I. G. M., M.B., Ch.B. Aberd. (Osmotherley); STREATFIELD, P. W., L.R.C.P. Lond., M.R.C.S. (Waltham Abbey).

Vacancies.

For further information refer to the advertisement columns.

Barnstaple, North Devon Infirmary.—H.S. £150.
Bolton Infirmary and Dispensary.—Asst. H.S. £100.
Cardiff Royal Infirmary.—Two H.S.'s. Each £100.
Cheshire Joint Sanatorium, Market Drayton, Salop.—Second A.M.O. £350.
City of London Hospital for Diseases of the Heart, Victoria Park, E.—H.P. £125.
Dorset Mental Hospital, near Dorchester.—Deputy Med. Supt. and Pathologist. £575.
Farringdon General Dispensary and Lying-in Charity, Holborn Circus, E.C.—Hon. P. and S.'s.
Greenwich and Deptford Guardians' Hospital, Vanbrugh Hill, Greenwich.—Radiographer. £400.
Hemel Hempstead, West Herts Hospital.—R.M.O. £200.
Herts Mental Hospital, Hill End, St. Albans.—Locum Tenens A.M.O. 7 guineas weekly.
Hospital for Consumption and Diseases of the Chest, Brompton, S.W.—H.P. £50.
Laboratories of Pathology and Public Health, 6, Harley-street, W.—Fourth Asst. Pathologist. £500.
Leeds Township Infirmary, Beckett-street, Leeds.—A.M.O. £275.
Manchester, Ancoats Hospital.—Sen. Res. Surg. O. £225.
Miller General Hospital for South-East London, Greenwich-road, S.E.—H.P. £150.
Orkney, Parish of Eday.—M.O.
Penmaenmawr, Pendyffryn Hall Sanatorium.—Asst. P. £400.
Plymouth Borough.—Port M.O. £750.
Romford Recuperative Hostel.—Res. Med. Supt. £500.
Royal Army Medical Corps.—Commissions.
Royal London Ophthalmic Hospital, City-road, E.C.—Refraction Asst. £100.
Royal Waterloo Hospital for Children and Women, Waterloo-road, S.E.—Anæsthetist. £105.
St. Mary's Hospital, London, W.—Med. Supt. £400.
St. Pancras Dispensary, 39, Oakley-square, N.W.—R.M.O. £225.
St. Thomas's Hospital Medical School.—Demonstrator of Anatomy. £400.
Salisbury General Infirmary.—H.S. £200.
Stoke-on-Trent Education Committee.—School Dentist. £500.
Stoke-on-Trent, North Staffordshire Infirmary.—H.S. £200.
Torquay, Local Education Authority.—Asst. Sch. M.O., &c. £600.
Wakefield, Clayton Hospital.—H.S. £200.

The Chief Inspector of Factories, Home Office, London, S.W., announces vacancies at Newark, Littlehampton, Clackmannan, and Oakengates.

Births, Marriages, and Deaths.

BIRTHS.

CRANSTOUN.—On Jan. 3rd, at Perry Hill, Worplesdon, the wife of Gordon Cranstoun, M.B., B.Ch., of a son.
ROSS.—On Dec. 27th, 1923, at Patna, India, the wife of Lieut.-Colonel William C. Ross, I.M.S., of a daughter.
WEBSTER.—At 1, Carden-terrace, Aberdeen, on New Year's Day, the wife of A. U. Webster, M.C., M.A., M.B., Fraserburgh, of a daughter.

MARRIAGES.

MILLS—KELSEY.—On Dec. 8th, 1923, Lieut.-Colonel Bernard Langley Mills, M.D., F.R.S.E., R.A.M.C. (retired), to Leila Susanne, widow of Reginald Kelsey and daughter of the late G. S. Cardew, M.D., J.P., Inspector-General of Hospitals, Bengal Army.

DEATHS.

BAMFORD.—On Jan. 4th, at The Hermitage, Uttoxeter, Charles Robert Bamford, M.R.C.S., L.R.C.P., aged 64.
BIRDWOOD.—On Jan. 2nd, at Twickenham, Roger Alan Birdwood, M.D. Camb., in his seventy-third year.
FISHER COCK.—On Jan. 4th, at Ashford, Middlesex, Morris Fisher Cock, M.R.C.S., L.R.C.P., aged 67.
GWYNN.—On Dec. 29th, 1923, at St. Mary's House, Whitchurch, Shropshire, Charles Henry Gwynn, M.D. Edin., M.R.C.S. Eng., aged 69.
LAMOND LACKIE.—At 7, Randolph-crescent, Edinburgh, on Jan. 5th, very suddenly, James Lamond Lackie, M.D., F.R.C.P.E.
SANKEY.—On Jan. 4th, at Woodstock-road, Oxford, Julius Ottaway Sankey, M.R.C.S., L.R.C.P.
TWEEDY.—On Jan. 4th, suddenly, after a short illness, John Tweedy, F.R.C.S., LL.D., Kt., aged 75.

N.B.—A fee of 7s. 6d. is charged for the insertion of Notices of Births, Marriages, and Deaths.

Notes, Comments, and Abstracts.

ALCOHOLISM IN VARIOUS SOCIAL CLASSES.*

BY H. M. VERNON, M.D. OXF.,
AUTHOR OF "INDUSTRIAL FATIGUE AND EFFICIENCY," ETC.

THE recent publication of the supplement to the seventy-fifth annual report of the Registrar-General exhibits the incidence of alcoholism in various social classes of the community, and permits the drawing of a number of conclusions as to the factors concerned in the promotion and the prevention of alcoholism. The report, publication of which was delayed by the war, relates to the years 1910–12, and might therefore be thought to be quite out of date, but I believe that the information to be adduced will negative this view. It is true that the 1920–22 data are likely to be more instructive, as they will show the effects of the great reduction in alcohol consumption caused by high taxation and by changes in the hours of sale, but they are not likely to be published for many years to come.

The report contains 191 tables of figures, recording the mortality of various groups of men from certain specified diseases, including "alcoholism" and "cirrhosis of the liver." The deaths recorded under these headings are more strictly defined than those recorded in previous reports under the headings of "alcoholism" and "diseases of the liver," but for purposes of comparison some of the present data have been calculated on the old basis, as well as on the new one. Considering only the men who died between the ages of 25 and 65, the group of "occupied and retired males" in England and Wales, which numbered 7,852,042 individuals, showed a mortality of 4 from alcoholism and of 13 from cirrhosis of the liver, when estimated on the present scale, whilst on the old scale it was 7 for alcoholism and 16 for diseases of the liver. Since 1900–02 the comparative mortality figure (which relates to a standard population of 71,005 men, aged 25 to 65) has fallen from 1004 to 790, or 21 per cent., whilst the mortality from alcoholism and liver diseases has fallen from 43 to 23, or 47 per cent. This relatively greater improvement in the alcohol mortality than in the general mortality is a very satisfactory feature, which is likely to be maintained in the 1920–22 data, when they are published. Thus the total deaths of all males in England and Wales from alcoholism and liver diseases is stated (in "The Alliance Year Book," 1922, p. 223) to be 84 per million in 1920, as compared with 156 in 1910, and 294 in 1900. The alcohol mortality in various social classes is shown in the table:—

Alcohol Mortality in various Social Classes.

	No. of groups averaged.	Deaths from alcohol of groups with comparative mortality of—						
		Under 600.	600 to 699.	700 to 799.	800 to 899.	900 to 1099.	1100 or more.	Mean percentage
A	6 to 15	7(1·3)	10(1·6)	13(1·7)	15(1·8)	16(1·6)	—	1·6
B	2 to 4	7(1·2)	—	—	—	17(1·8)	28(2·3)	1·8
C	3 to 5	15(2·8)	24(3·7)	22(2·9)	—	—	—	3·2
D	2 to 6	16(3·0)	20(3·1)	23(3·0)	—	35(3·8)	—	3·2
E	2 or 3	—	—	—	—	53(5·0)	134(9·0)	7·0

Social Class.—A = Skilled and semi-skilled workmen. B = Unskilled workmen. C = Professional classes and clerks. D = Shopkeepers, &c. E = Brewers, publicans, &c.

The Registrar-General divides up the various occupational groups into eight social classes, but five of them (viz., 3, 4, 6, 7, and 8) may conveniently be classified together as "skilled and semi-skilled workmen," though I am excluding the groups engaged in the production and sale of alcoholic liquors. The other three social classes consist of "unskilled workmen," "upper and middle classes," and "intermediate," these latter consisting for the most part of shopkeepers. Some of the occupational groups are too small to yield reliable data, so I have ignored any group in which the number of deaths from alcohol (i.e., alcoholism and cirrhosis of the liver) was less than ten. This plan tends to eliminate rather too large a proportion of the more abstemious groups, but the error introduced thereby will not affect any of the arguments advanced. All the data referred to relate only to men between the ages of 25 and 65.

* An abstract of a paper introductory to a discussion before the Society for the Study of Inebriety, held in the rooms of the Medical Society of London, on Jan. 8th, 1924.

Alcoholism among Skilled and Semi-Skilled Workmen.

The combined class of skilled and semi-skilled workmen is by far the largest, so it will be considered first. The mortality of these groups from all causes varies between the extremes of 457 for gardeners and 1196 for potters, and for purposes of comparison I have split them up into the five divisions recorded in the table. The first division comprises the six occupational groups in which the comparative mortality was less than 600, and it will be seen that on an average these groups showed an alcohol mortality of 7. The next division includes the eight groups with a comparative mortality of 600 to 699, and their alcohol mortality averaged 10. In the succeeding divisions the alcohol mortality averaged 12, 15, and 16, so it follows that the alcohol mortality increased steadily as the general mortality increased. Expressed as a percentage on the general mortality, the alcohol mortality in the five divisions was 1·3, 1·6, 1·7, 1·8, and 1·6—i.e., it was practically constant.

What is the significance of the close correspondence between the two mortalities? In the first place, to what extent is the general mortality affected, indirectly, by excessive indulgence in alcohol? Evidence on this point can be obtained by comparing the causes of death in typical groups of individuals liable to excessive indulgence in alcohol with other groups who are not so liable. In order to render the comparison valid, it is essential that the groups compared should be men of similar social class, living under similar conditions as regards housing and general character of work (indoor or outdoor, light or heavy). The most suitable group provided by the Registrar-General is that of "inn, hotel—keepers; publicans; spirit, wine, beer—dealers," and for comparison purposes the group of "all shopkeepers." This includes men such as drapers, grocers, butchers, greengrocers, stationers, ironmongers, tobacconists, and chemists. From the mortalities of the two groups from diseases of the respiratory, circulatory, digestive, nervous, and urinary systems, it appears that in every instance the mortality of the publicans was 1·6 to 2·0 times greater than that of the shopkeepers. From alcoholism and liver cirrhosis it was 7·8 and 6·3 times greater, whilst the total deaths from these causes were 132 more numerous than in the shopkeepers. The total deaths from all causes were 557 more numerous, and if we deduct the deaths from alcohol, we find that the excess of deaths in the publicans which were presumably caused indirectly by alcohol come to 425, or about three times more than the direct deaths.

I have also compared two other occupational groups: these are barmen on the one hand and indoor domestic servants (other than those in hotels) on the other. They are not nearly such closely comparable groups as the previous pair, but they are the best I could find. It will be seen that the frequency of occurrence of the various diseases in barmen, as compared with domestic servants, was very variable, and ranged from 1·4 to 3·2. The total deaths from alcohol were 86 more numerous in barmen, whilst the deaths from all causes combined were 973 in excess. That is to say, the deaths due indirectly to alcohol were apparently ten times more numerous than those caused directly. This estimate differs widely from the former one, and all that we can conclude with safety is that the indirect effects of alcoholic excess are much greater than the direct effects, and are probably more than three times as great.

If, for the moment, we assume that the indirect deaths due to alcohol are ten times as numerous as the direct deaths, they still fail to account for more than a third of the rise of comparative mortality shown in the table. Thus, if comparative mortalities of 550, 650, 750, and 850 are corrected on the tenfold alcohol basis, they become reduced to alcohol-free mortalities of 473, 540, 607, and 685 respectively. Hence we must look elsewhere than to alcohol in order to account for the larger part of the variations in the general mortality of industrial workers. Evidence on this point, yielded by examining the occupational groups falling in the various divisions, suggests that the relationship between the alcohol mortality and the general mortality of industrial workers is very different from that described in publicans and barmen. Owing to the unhealthy conditions under which many of them carry on their work their general health suffers, and thereby they become readier victims to alcohol. Possibly they may indulge in no more alcohol than other men who work under healthier conditions, but may owe their greater mortality to diminished bodily resistance. On the other hand, it is probable that their reduced health makes them more ready to seek comfort in drinking, but, whatever the weight to be ascribed to these or other causes in accounting for the effects produced, there can be no doubt whatever that by improving the conditions under which industrial work is carried on, we shall reduce both the general mortality and the alcohol mortality. The better the factories are ventilated and lighted, the more

frequently changing and washing rooms are provided, whereby over-heated workers (especially miners and iron- and steel-workers) can change into dry clothes directly their day's work is over, the better will be the general health and self-respect of the men employed in industry and the greater their sobriety.

Alcoholism Among Unskilled Workmen.

The Registrar-General's class of "unskilled workmen" includes only a few and widely divergent occupational groups. Two of them, the brickmakers and the platelayers, have a comparative mortality rate of 567 and 621 respectively, and an alcohol mortality of 8 and 6. Hence they resemble the best of the skilled workers. This is owing to the fact that they lead a vigorous open-air life. The remaining groups of unskilled workmen are very different, for they show both a high general mortality and a high alcohol mortality. One division, with a comparative mortality of 900 to 957, includes coal-heavers, carmen, and cabmen and grooms. Their alcohol rates are 12, 17, and 23 respectively, and represent the same percentage on general mortality as is observed in the corresponding groups of skilled workmen. The remaining groups of unskilled workmen are not represented at all amongst the skilled, as their comparative mortality varied from 1102 to 1507, and their alcohol mortality from 22 to 35. They comprise watermen, dock labourers, messengers, and costermongers, and they are clearly of a different social class from the majority of skilled workmen, as they are not only unskilled, but they are casual workmen.

Alcoholism Among Professional Classes and Shopkeepers.

Widely as the unskilled labourers differ from the skilled, there is in some ways a greater jump still when we proceed to the other two social classes tabulated by the Registrar-General. Social Class I., comprising the "upper and middle classes," consists chiefly of professional men and clerks. Their comparative mortality figure ranges from 506 to 863, and has a distinctly lower average than that of the other social classes. In spite of this, their alcohol mortality is nearly twice as great as that of the skilled industrial workers. It will be seen from the table that whilst the alcohol mortality of the first three divisions of skilled workmen was 7, 10, and 12, that of the corresponding divisions of professional men and clerks was 15, 24, and 22. The three groups with a general mortality of less than 600 consists of schoolmasters, bank officials, and of civil service officials and clerks. Their alcohol mortality is 12, 17, and 17 respectively, so the schoolmasters alone are comparable in alcoholic restraint to the average skilled industrial worker. Best of all is the group of clergy, with a general mortality of 443 and an alcohol mortality of 4, but owing to the total number of deaths from alcoholism being less than 10, the group is excluded from my classification.

The division with a comparative mortality of 600 to 699 comprises railway officials, builders, doctors, lawyers, and artists, and their alcohol mortality is 16, 20, 27, 28, and 31 respectively. That is to say, the lawyers and doctors, whose professional duties teach them daily the evils of alcoholism, are themselves amongst the greatest sinners. The third division, whose general mortality varies from 724 to 765, comprises insurance agents, law clerks, commercial travellers, and chemists and druggists. Their alcohol mortality is 8, 24, 25, and 35 respectively. Finally, the large group of commercial clerks has a general mortality rate of 863, and an alcoholic mortality of 20. In the table this group has been put with the 700–799 division for averaging purposes.

The percentages of alcohol mortality on general mortality have an average value of 3·2 for the shopkeepers, or the same as that observed in the professional classes. It is twice the percentage alcohol mortality observed in the skilled workmen, and nearly twice that in the unskilled workmen. What are the causes of these tremendous differences? Firstly, the workmen have to pursue occupations which are chiefly of a muscular character, and are often carried on in the open air. On that account they maintain themselves in a better physical condition than the professional men and shopkeepers, who are mostly employed indoors on work which requires no muscular effort, and is frequently sedentary. Secondly, the workmen, as a class, are not so well-to-do as the professional men and shopkeepers, and can less readily afford expenditure on alcoholic liquors. However, this argument is not one of great importance, for we have seen that clerks, taken as a whole, have as great an alcohol mortality as professional men, though they are certainly less well-paid, whilst the badly paid unskilled workmen have a greater alcohol mortality than the better-paid skilled workmen.

The Effect of Drinking Spirits.

The chief reason of the difference between the alcohol mortality of workmen and of the other two classes is due, I believe, to the form of intoxicants indulged in. The workman takes his alcohol mostly in the form of beer, whilst the professional classes and the shopkeepers take theirs in the form of spirits. As spirits contain eight to ten times more alcohol than beer, it is very much easier to introduce excess of alcohol into the system. Again, spirit-drinking is easily indulged in at all times of the day by those who can afford to keep a supply of spirits at home, and, as Dr. W. C. Sullivan pointed out nearly twenty years ago, the frequent drinking of small doses is peculiarly apt to bring about chronic alcoholism, though it does not cause drunkenness. Convivial drinking, on the other hand, is very likely to lead to drunkenness, but as it is indulged in only occasionally, it is much less harmful to the system.

PUBLIC HEALTH IN BURMA.[1]

THE population of the area under registration for vital statistics in Burma numbered 10,771,190 at the census enumeration of 1921, showing an increase of 946,800 since 1911; this amounts to 9·64 per cent. The immigrants numbered 331,992 and the emigrants 303,806, the former showing a decrease of 9188, and the latter an increase of 55,821 on the previous year's statistics. The birth-rate was 29·85 per 1000, as compared with 33·78 in the previous year and 33·33 for the quinquennium; but if the latter ratio be corrected, to allow for the exaggeration due to the use of the 1911 census population as a basis of calculation, the quinquennial ratio becomes 31·67. There was a considerable difference between the ratios for Lower and Upper Burma, the former being 26·90 and the latter 34·82 in 1921; and for the quinquennium (corrected) 29·67 and 34·25 per 1000. Lieut.-Colonel C. E. Williams, I.M.S., the Director of Public Health for the province, states, however, that "the evidence of the 1921 census points to the general birth-rate in town and country being 50 per mille or above, confirming the estimates of previous censuses and the experience of officers of this department." There appears to be considerable "neglect of registration by the public and local registrars." The general death ratio for the province was 21·45 per 1000, as compared with 27·40, the corrected ratio for the quinquennium, 1916–20. In the rural areas (with a population of 9,558,291) the mortality was 19·66; in the towns (population 1,212,899) the ratio was 35·55 per 1000; among the former the ratios varied from 14·37 in Myingyan and 16·23 in Sagaing (both districts in Upper Burma), to 28·00 in Sandoway (Lower Burma) and 29·53 in Kyaukse (Upper Burma). It is noteworthy that the lowest and highest mortality ratios occurred in two rural districts adjoining each other, Myingyan and Kyaukse; in the same two rural districts the quinquennial death-rates had been 23·01 and 43·06 respectively. The ratios of death from "fever" in 1921 were 3·00 and 10·28 per 1000. Among the towns the total mortality varied from 18·38 at Yamethin, in Meiktila division, and 18·63 at Syriam in Pegu division, to 54·36 at Prome (also in Pegu division), and 73·16 at Mawlamyainggyun in Irrawaddy division; at this latter town fever, dysentery, cholera, and plague were prevalent. At Rangoon and Mandalay the birth ratios were 18·29 and 14·41 respectively; the death ratios were 35·28 and 43·27.

Infantile Mortality.

In regard to infantile mortality there has been a marked improvement. The ratio per 1000 births was 172·06, compared with 186·65 in 1920, 216·90 in 1919, and 271·24 in 1918; the ratio for Upper Burma, which had been 260·33 in 1919 (compared with 185·83 in Lower Burma), has fallen to 173·65 (compared with 170·84 for Lower Burma). "Never before has the Upper Burma ratio so closely approached that of Lower Burma." In the rural areas the mortality declined from 205·33 per 1000 births in 1919 to 177·92 in 1920, and 160·37 in 1921; in the towns from 320·99 in 1919 to 271·22 in 1920, but rose to 278·84 in 1921. Very high infantile mortality was recorded in several large towns, such as Rangoon (322·67), Mandalay (341·85), and Shwebo (458·96); but in some cases it is supposed that a large number of births (mainly female) were not registered. A child welfare endowment fund was organised at the instance of Lady Craddock, wife of the Lieutenant Governor, to coördinate the work of the societies already established, and is destined to become a valuable asset in the movement in this province. 1095 confinements were attended in Rangoon and 456 in Mandalay; there was not a single death among the mothers in these cases. At various towns in the province committees of European ladies render most valuable assistance in regard to the welfare of children, and at Taunggyi (Upper Burma) Colonel Williams "was greatly struck by the interest shown in the movement by a large number of Shan ladies and women of the labouring class."

[1] Report on Public Health Administration. Rangoon Government Press, 1922.

Infectious Diseases.

Cholera was present in all districts in Lower, and in five out of the 12 in Upper Burma, with six isolated cases in five other districts. Not a single death was reported from this cause in Lower Chindwin or Meiktila districts. The total deaths numbered 3791 (0·35 per 1000); in Sandoway district the mortality was 3·48, and in Mergui 4·50 per 1000. The ratio for towns was 0·94 in Lower and 0·09 in Upper Burma; for rural areas 0·45 and 0·09 respectively. The chief prevalence occurred in the Irrawaddy division, where serious outbreaks occurred in every district during the first five months of the year, in which period 1130 deaths occurred from this cause. "The protective influence of a pure and protected water-supply against the spread of cholera infection is illustrated by the experience of Monywa town, where outbreaks of the disease were of almost annual experience until 1916, when the water-supply scheme was completed, since which year no death from cholera has been returned from that town." There was a great reduction in small-pox, from which cause 987 deaths were returned (0·09 per 1000), against 2853 in 1920; in Lower and Upper Burma the ratios were 0·07 and 0·13 respectively; in Thaton district (Tenasserim division) the mortality was 0·42; in Mandalay 0·50; in five districts there was not a single death from this cause (Kyaukpu, Hanthawaddy, Pyapon, Tavoy, and Yamethin). Plague caused 4403 deaths (0·41 per 1000), the ratios for Lower and Upper Burma being 0·53 and 0·21 respectively; the corresponding quinquennial ratios had been 0·67, 0·70, and 0·61 respectively. Rangoon district had a mortality of 3·29 per 1000, representing 1126 deaths; for Mandalay district the corresponding figures were 0·94 and 334; and for Prome 1·64 and 609; for the whole province the death-rate from plague was 2·88 in the towns and 0·09 in the rural districts. Colonel Williams points out that there are two plague seasons in Rangoon, the first reaching its maximum prevalence in March or April, and the second in July or August; a simular incidence occurs at Prome. The causative influences or factors have not been determined; they may be connected with the presence of different species of rats or fleas, or special social or economic conditions. The chief preventive measures adopted were rat-destruction and inoculation; "both measures are optional, and neither is making much progress"; nevertheless, 471,549 rats were destroyed (405,178 in Rangoon), and 43,552 inoculations performed.

The "fever" death ratio (7·68 per 1000) compares favourably with that of the preceding quinquennium (10·83). "It is clear that the position in 1911 has nearly been regained in 1921, and that the influence of influenza in raising enormously the fever mortality ratios of the previous three years has to a great extent lapsed." In the several districts the ratios varied from 2·18 in Rangoon, 3·13 in Myingyan, and 3·94 in Ma-ubin to 16·0 in Tavoy; in the rural areas the range was from 3·0 in Myingyan to 16·61 in Tavoy, and for the towns from 2·18 in Rangoon and 2·26 in Danubyu to 15·07 at Mawlamyainggyun and 15·98 at Wakema. The statistics of death from actual malaria are available only for the towns, and these are not considered to be trustworthy. Enteric fever was reported as causing 231 deaths, but was probably much more widely distributed than would appear from the returns. There was some prevalence of influenza from time to time in all parts of the province. In towns 537 deaths were returned as due to this cause, of which 233 occurred in Rangoon and 103 in Mandalay; in rural areas 112 deaths were reported. Dysentery and diarrhœa caused 9728 deaths (0·90 per 1000); of these 8119 occurred in Lower and 1609 in Upper Burma. "There can be little doubt that deaths from these complaints are much more frequent than the Upper Burma returns indicate." In 22 jails 8896 prisoners were examined for ankylostoma infection, of whom 67·43 per cent. were found to be infected; chenopodium oil was administered in capsules with good results. The Port Health Station at Rangoon is now provided with a commodious shed for examination of all classes of passengers, and two steam disinfectors have been installed; this port now compares favourably in its health work and accommodation for passengers with anything yet accomplished in India.

Prison Administration.[2]

In the Report on Prison Administration in Burma for 1921 it is stated that there are indications that the "jail population is still steadily rising." At the beginning of the year the total prisoners in the seven central and 23 district jails numbered 15,796; during the year 45,639 prisoners were received and 45,204 discharged, the number remaining at the end of the year being 16,231. The daily average population was 16,088, of whom 15,009 were convicts; of these 135 were females. It had been found that the illicit use of tobacco was the great cause of breaches of discipline; Lieut.-Colonel H. H. G. Knapp, I.M.S., Inspector General of Prisons for the province, who forwards this report, recommended that tobacco in moderation should be allowed as a reward for good conduct. The local government approved of the suggestion, and at the Moulmein jail the experiment was tried, by allowing a cheroot once a day to well-behaved prisoners and to convict officers; the competition to get into the smokers' list was keen, and the jail superintendent stated that he had "seen nothing but good resulting from this experiment," the number of punishments in this jail falling from 683 to 211—that is, from 86·12 to 30·89 per cent. of the prison population. Colonel Knapp desires an extension of the method to some other jail to serve as a check to this experiment. The Burmese (of both sexes) are keen smokers, and "devote much energy to the congenial task of outwitting the staff, with fair success." At Prome a "jail tobacco treasury" was discovered hidden in a loft in the female ward, access to which involved a climbing feat by one of the young female convicts. In regard to the health of the prisoners, for the average population of 16,088 the average daily sick ratio was 24·06 and the mortality 16·22 per 1000; the former was higher than in any of the four years preceding (in which it varied from 15·19 in 1917 to 23·32 in 1918), but the death-rate was considerably lower (19·0, 25·59, 28·53, and 19·92 in the four years respectively). The increase in daily sick "shows that care was taken to admit those that required treatment and that the 24 hours rule was observed better than last year. This is especially true of the Rangoon jail." Colonel Knapp has no doubt good reason for this explanation of the increase in this particular instance, but it is obviously not applicable as a general proposition.

In the seven large central jails at Rangoon, Insein, Bassein, Myaungmya, Thyetmyo, Mandalay, and Myingyan, the health statistics showed very wide variations. At Rangoon, with an average strength of 2336 (not including 12 Europeans), the admissions to hospital amounted to 860·02 per 1000, the average daily sick were 38·53, and the deaths only 10·27 per 1000; at Thyetmyo (average strength 1029) the corresponding ratios were 69·00, 6·80, and 17·49. The death-rate was highest at Mandalay (25·97), and Myingyan (24·31); at Myaungmya it was only 9·83. In the 24 district jails the hospital admissions varied from 51·72 per 1000 at Sandoway and 72·99 at Kyaukpyu, to 958·51 at Prome and 1434·18 at Akyab; the average daily sick were only 7·30 per 1000 at Kyaukpyu, 6·85 at Shwegyin, and 4·20 at Magwe; at Pagan, Katha, Mogok, and Tavoy the ratios were 27·27, 27·78, 32·61, and 33·11 respectively; not a single death occurred in the jails at Mergui, Mogok, Shwebo, Taungdwingyi, Meiktila, Yamethin, or Thaton, the combined average strength of the seven jails being 718. In the other district jails the mortality varied from 6·62 at Tavoy and 6·85 at Shwegyin, to 57·55 at Paungdè, and 136·36 at Pagan. For the province as a whole the chief cause of sickness among the convicts (numbering 15,009 out of the total 16,088 daily strength) was malaria and its sequelæ, enlarged spleen and cachexia, with an admission ratio of 39·31 (590 cases), but only four deaths are returned as due to this cause (0·27 per 1000). For dysentery there were 574 admissions (38·24 per 1000) and 27 deaths (1·80 per 1000). Only four cases of cholera occurred, three at Akyab and one at Toungoo, all fatal. There has been a marked decline in tuberculous disease, "and this is the more remarkable, in that medical officers and their staffs pay greater attention to early diagnosis and segregation than formerly." The admissions numbered 180 and the deaths 52. Pneumonia, on the other hand, increased from 49 admissions and 14 deaths (presumably in 1920) to 79 admissions and 27 deaths in 1921 (all among convicts); 22 of the admissions and four deaths occurred at Mandalay. There were 41 admissions for enteric fever, with 11 deaths, 17 of the cases occurring at Mandalay, 11 at Insein, and five at Rangoon. It is stated that "typhoid is rife in Mandalay town," where 81 deaths from this cause were recorded, probably an under-estimate. Much good work is done at the Meiktila Juvenile Jail, where there was a daily average of 133 convicts under the care of a Burman superintendent. The boys are instructed in carpentry, shoemaking, sawing, and (most important of all) in agricultural work on a farm attached to the jail. The after-history of 113 cases showed that 77 were in some kind of regular work, and only seven are known to have relapsed.

[2] Rangoon Government Press. 1922.

HEALTH CONDITIONS IN NYASALAND.

THE European population at the end of 1922 was returned at 1499, the Asiatic at 662, and the Native at 1,185,655. During the year the health of the Protectorate was satisfactory. There were a few cases of small-pox in the early part of the year, the residue of an outbreak which occurred at Mlanje in 1921. No case of plague was reported. Fewer cases of venereal diseases were recorded than in 1921; 341 cases of yaws were treated, as against 235 in the previous year. Most of these cases occurred at Karonga; 70 rural

dispensaries were opened during 1922. These are worked by natives, who have had an elementary training in dealing with minor ailments and in dressing wounds. Although these dispensaries were open for about half the year only, their existence resulted in double the number of native out-patients being treated—39,000, as against 19,000 in 1921. The in-patients numbered about the same as in the previous year—2300. As regards Europeans, as in 1921, about 500 were treated by the medical department, and there were 15 deaths, six of which were due to blackwater fever. Malaria accounted for nearly 28 per cent. of the European illnesses. Amongst the native population eight cases of sleeping sickness were recorded. Villages infected with human trypanosomiasis were removed to a "fly-free" area. The rainy season, 1921–22, was an unsatisfactory one, as the rainfall was much below normal, and conditions of drought, followed by a scarcity of native foodstuffs, prevailed throughout the southern part of the Protectorate. A considerable amount of suffering was entailed by the famine, but there is no reason to think that the deaths from starvation were numerous. The natives bore the distress and suffering with courage and fortitude, and expressions of gratitude to the Government were received from principal headmen for the assistance rendered to them and their people. The climate of Nyasaland in its essential features is similar to that of the rest of Eastern Africa within the tropics, but it is necessarily diversified owing to variations in latitude, altitude, and general configuration of the terrain, presence or absence of rivers, forests, &c., but as a large proportion of the Protectorate lies at an altitude of 3000 feet or more the heat is not generally excessive. The south-east monsoon commences to blow strongly in September, and the first rains may be expected any time after mid-October. From their commencement to the end of December it is usual to experience violent thunderstorms and heavy precipitation in a few hours, followed by an interval varying from 1 to 15 or 20 days of intense heat. With the return of the sun from its southern limit of declination the thunderstorms diminish in intensity and frequency, and are replaced by steady rain, January, February, and March being usually the wettest months as regards duration of rainfall, as well as actual amount. After March the frequency and intensity of rainfall diminishes rapidly, and from May to September the climate is comparatively cool and dry.

DUSTLESS SWEEPING.

WE have had brought to our notice a preparation bearing the name of "Kleensweep," which, it is claimed, offers a certain and simple method of eliminating the raising of dust in the operation of sweeping floors. A few ounces of the preparation are laid in a straight line across the floor and swept along with the dust which it absorbs and entangles. One preparation is suitable for use on linoleum, wood or concrete, another for carpets. Both contain substances which exert a cleansing and disinfecting action and emit an aromatic odour that is distinctly agreeable. We have tried the preparation on floors of various kinds and consider that it would take a useful place in factories and institutions where the old-fashioned method of sprinkling floors with water or tea-leaves is employed. "Kleensweep" is sold in sacks at 11*s.* per cwt., and can be obtained from the Kleensweep Manufacturing Co., 35 to 37, Verulam-street, London, E.C. 4.

THE WELLCOME FOUNDATION.

THE Wellcome Foundation, Ltd., has recently been registered as a private limited company, with a capital of £1,000,000 to acquire from Mr. Henry S. Wellcome the well-known business of Burroughs Wellcome & Co., and the various scientific institutions founded and owned by Mr. Wellcome, who will be the governing director of the Foundation during his life. We understand that the Foundation has been formed entirely for private and family reasons, and that the conduct and management of the business will be continued on exactly the same lines as heretofore. The scientific institutions will continue as in the past under separate scientific direction.

PENSIONS TO WIDOWS OF DISABLED MEN.

THE Minister of Pensions announces a further decision of the Government in respect of claims to pension by widows of men disabled in the war, who die more than seven years after discharge or removal from duty: (1) A new Article will be inserted in the Royal Warrant providing, without any time limit, for the grant of pension at maximum rates to the widow of any pensioner whose death is certified to be wholly due to the nature or condition of his pensioned disability, such nature or condition being directly the result of his war service. The formula will cover cases of serious aggravation of a disability not directly due to war service. (2) In regard to claims made under the new Article and rejected by the Ministry of Pensions, there will be a right of appeal to the Pensions Appeal Tribunal. (3) Other cases occurring beyond the seven years' limit in which the man's death, though not wholly and directly the result of war service, was nevertheless so far connected with it as to justify some measure of compensation, will be considered. Eligibility for pension under that Article is governed by the extent to which the man was recognised during his lifetime to be disabled by war service, but the minimum limit of 50 per cent. which was laid down is now to be reduced to 40 per cent.

THE JOHN HANCOCK CARTRIDGE PEN.

THE utility and convenience of many fountain pens have often to be discounted by the troubles attending their filling. In the case of the John Hancock Cartridge Pen (Ingenuities, 23A, Old Bond-street, London, W.), a specimen of which has been sent to us for trial, filling troubles are obviated by the use of a sealed metal cartridge of special ink which is used for recharging the pen. The act of screwing in the cartridge perforates the sealed end and allows the ink to flow to the nib. Each cartridge contains sufficient ink for writing on an average 6000 words. The barrel of the pen is constructed of stout hard rubber, and an ingenious "feed" gives an even flow to the ink. A short trial of the pen seems to justify the claims of the makers that it does not leak or clog. The nibs, which are fashioned for different types of handwriting, are made of 14 carat gold, with specially treated iridium points, and the complete pen is sold in a neat box containing three cartridge refills in a pocket case, at the price of 21*s.* Packets of three refill cartridges—estimated at six weeks' supply—can be obtained for 1*s.*

INDEX TO "THE LANCET," VOL. II., 1923.

THE Index and Title-page to Vol. II., 1923, which was completed with the issue of Dec. 29th, will shortly be published. A copy will be sent gratis to subscribers on receipt of a post-card addressed to the Manager of THE LANCET, 1, Bedford-street, Strand, W.C. 2.

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